ARIZONA MEDICINE

Journal of ARIZONA MEDICAL ASSOCIATION

VOL. 8, NO. 4 APRIL, 1951

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Published monthly by the Arizona Medical Association. Business office at 401 Heard Building, Phoenix, Arizona. Subscription $3.00 a year, single copy 25c. Entered as second class matter March 1, 1921, at Postoffice at Phoenix, Arizona, Act of March 3, 1879.

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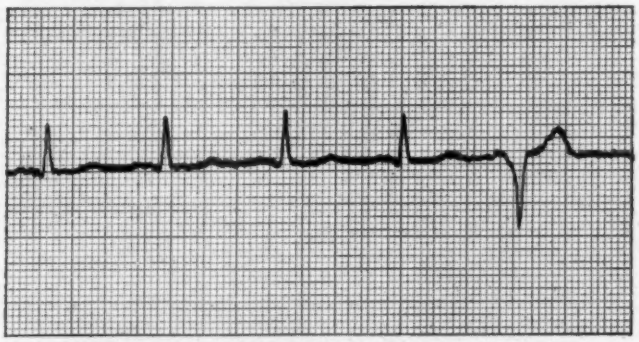
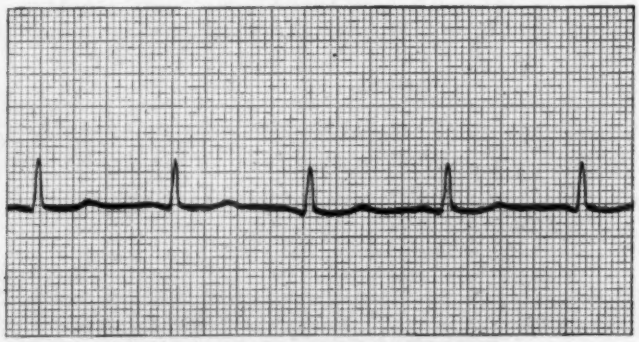


Lead I. Control tracing, ventricular premature contraction.



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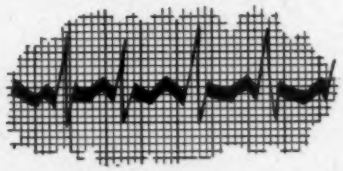

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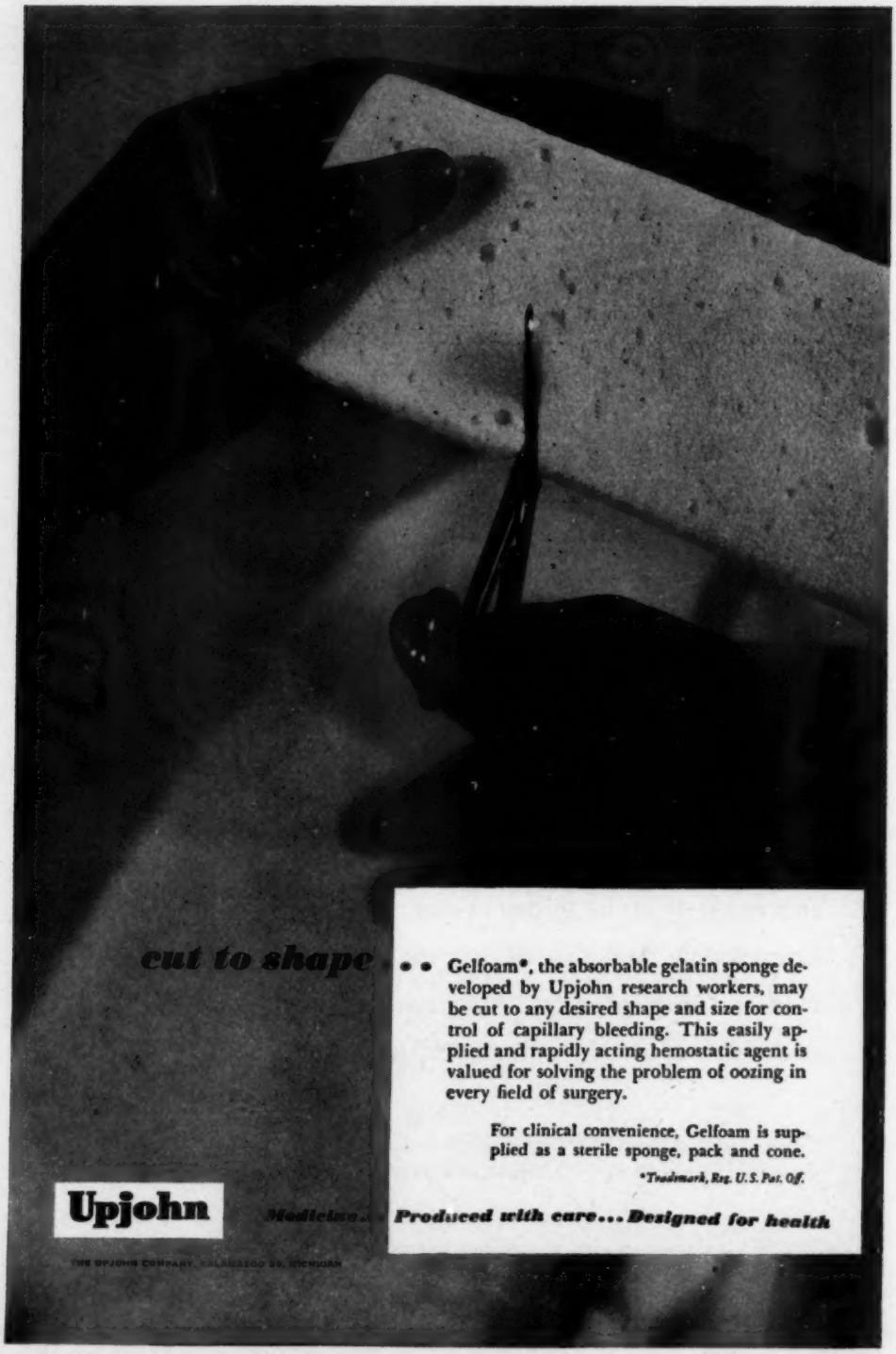
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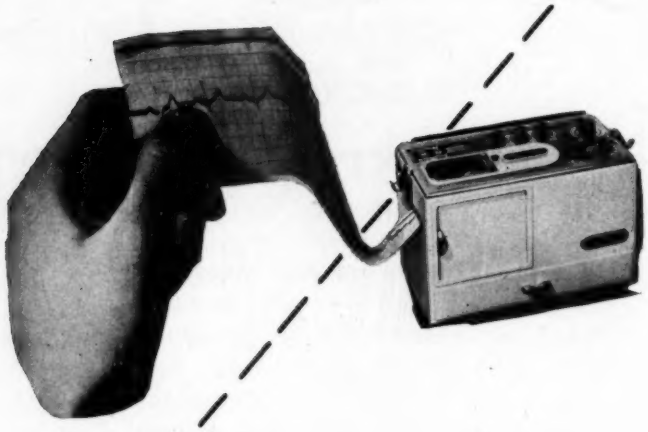

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Normal schedule of development (auxodrome) plotted on Wetzel Grid.[1]

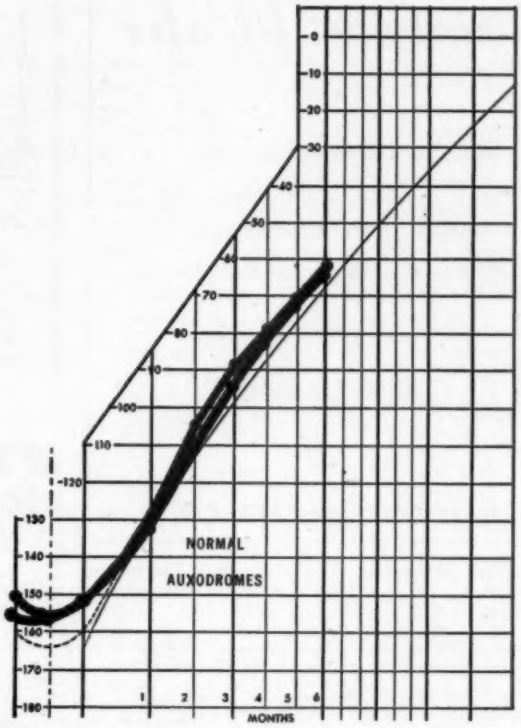
CURVE A

Composite Wetzel Grid auxodrome of 60 unselected infants on S-M-A from birth to 6 months of age.

CURVE B

Growth data, recomputed on Wetzel Grid, based on "selected subjects, most of whom were favored by environment;"[2] age: from birth to 6 months.

1. Wetzel, N. C.: J. Pediat. 29:439, 1946.
2. Jackson, R. L., and Kelly, H. G.: J. Pediat. 27:215, 1945.



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Relationship of Stress to Autonomic Lability

Studies in psychosomatics have shown that functional disorders often are a result of the patient's inability to adjust to emotionally stressful situations (stressor factors).

Nervous tension and chronic anxiety, discharged through a labile Autonomic Nervous System, can cause somatic disturbance. [1,2] Such states may involve any one of the organ systems or several at one time. [1,3] The outline below is designed to relate gastrointestinal and cardiovascular symptomatology to the exaggerated response of the autonomic nervous system.

	Physiologic Effects of Autonomic Discharge	
	Sympathetic	Parasympathetic
Gastro-intestinal System	Hypomotility Intestinal Atony Hyposecretion Reduced salivation	Hypermotility Gastrointestinal spasm Hypersecretion
Cardio-vascular System	Rapid heart rate Peripheral vaso-constriction	Slow heart rate Vasodilatation
Functional Manifestations	Palpitation Tachycardia Elevated blood pressure Dry mouth and throat	Heartburn Nausea-vomiting Low blood pressure Colonic spasm

The data here tabulated is from references [3,4,5,6,7], given below.

When the clinical picture is suggestive of functional disorder, the diagnosis is supported by the presence of the following indications of autonomic lability:

Variable Blood Pressure
Body Temperature Variations
Changing pulse rate
Deviations in B. M. R.
Exaggerated Cold Pressure Reflex
Oculo-Cardiac Reflex Abnormalities
Glucose Tolerance Alterations

Therapy in these cases is directed toward: 1) relieving the somatic disturbance to prepare the patient for psychotherapy*; 2) guidance in making adjustment to stressful situations and correction of unhealthy attitudes.

*Drug treatment using adrenergic and cholinergic blocking agents in conjunction with sedatives. [8,9,10]

1. Ebaugh, F.: Postgrad. Med. *4:* 208, 1948. 2. Wilbur, D.: J.A.M.A. *141:* 1199, 1949. 3. Williams, E. and Carmichael, C.: J. Nat'l. Med. Assoc. *42:* 32, 1950. 4. Goodman, L. and Gilman, A.: The Pharmacological Basis of Therapeutics, The Macmillan Co., 1941. 5. Katz, L. et al: Ann. Int. Med. *27:* 261, 1947. 6. Weiss, E. et al: Am. J. Psychiat. *107:* 264, 1950. 7. Alvarez, W.: Chicago Med. Soc. Bulletin, 581, 1950. 8. Rakoff, A.: A Course in Practical Therapeutics, Williams and Wilkins, 1948. 9. Karnosh, L. and Zucker, E.: A Handbook of Psychiatry, C. V. Mosby Co., 1945. 10. Harris, L.: Canad. M.A.J. *58:* 251, 1948.

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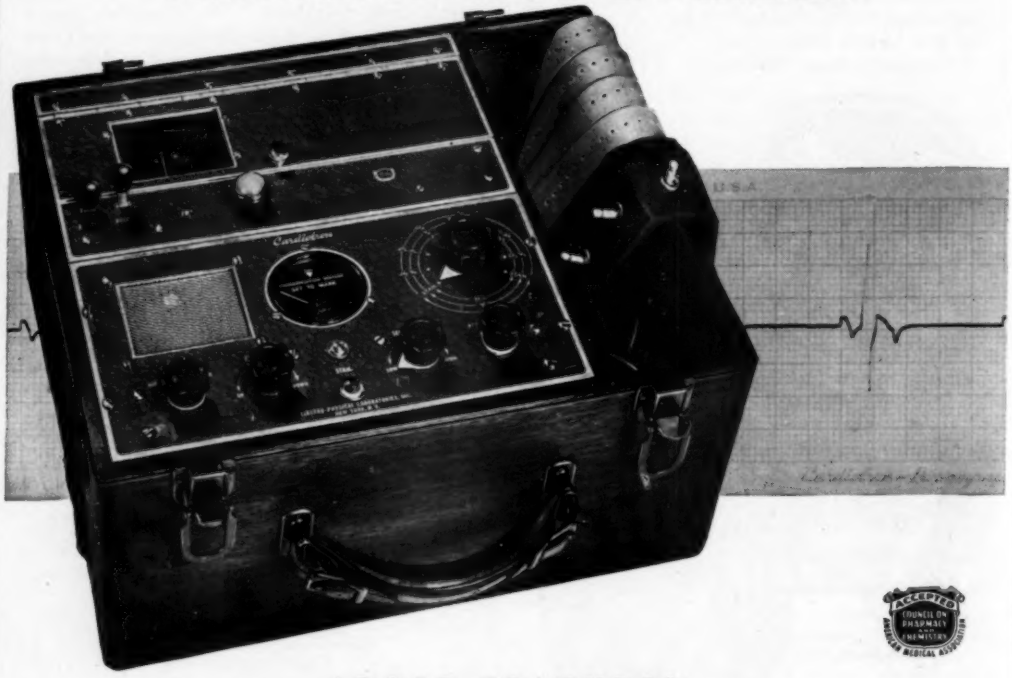

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Journal of ARIZONA MEDICAL ASSOCIATION

VOL. 8, NO. 4 APRIL, 1951

TREATMENT OF CHEST EMERGENCIES—MEDICAL ASPECTS

ROGER O. EGEBERG, M.D.
Los Angeles

A discussion of the treatment of medical emergencies of the chest in a fifteen minute period will necessitate the compendium approach. In most instances, the important thing about treatment is the consideration of all the possible diagnoses. I am, therefore, discussing a rather complete list of such emergencies. As far as the actual treatment is concerned, I have tried tc limit myself to the emergent treatment; in other words, that part of the treatment which should be instituted almost automatically, after which one could sit down to give thought to the problem.

For the purposes of this talk, I am assuming the following definition of a medical chest emergency:

SLIDE 1

MEDICAL CHEST EMERGENCIES

Definition: Symtom complexes within the chest, arising slowly, rapidly or suddenly, in which the physician sees the patient at a time when treatment must be instituted immediately –such treatment being in the field of medicine.

It is impractical to group these emergencies according to symptoms. They are, therefore grouped anatomically.

SLIDE 2

LOCATION OF MEDICAL CHEST EMERGENCIES

I. Pleura and lungs
II. Mediastinum
III. Heart
IV. Vessels
V. Diaphragm
VI. Brain

We shall take up all these headings and list the emergencies that might occur in each anatomical group.

SLIDE 3 I. PLEURA & LUNGS

A. Bronchial Asthma
B. Spontaneous Pheumothorax
C. Pneumonia
D. Pulmonary edema due to inhaled gases
E. Hemoptysis
F. Emphysema

Now the treatment of these emergencies:

SLIDE 4 A. Bronchial Asthma

Rx. 1. Intravenous fluids–5% glucose in water (saline)
2. Aminophyllin–I.V.
3. Epinephrine–I.M.–I.V.
4. Oxygen–catheter–mask–tent
5. Sedative? Never morphine

Bronchial asthma is an emergency more often than we realize and in spite of the frequent talk to the contrary, people do die in their asthmatic attacks. Those that become severe emergencies usually do so after being in a state of chronic asthma for weeks or months. They are almost always emotionally upset, either due to their long-contineud air hunger or their emotional difficulties may be the primary cause of their asthma. They have not been able to eat nor drink, are very much dehydrated and have probably had fairly large amounts of adrenalin over a period of months. Intravenous fluids are, therefore, placed first on the list of treatments. If they have been vomiting and sweating a lot, this should be normal saline; if they have not, 5% glucose is preferable as they can use the food in addition to the water.

Aminophyllin can be given directly into the tubing of the intravenous set. If the patient has been taking epinephrine for weeks or months, but at a constant dosage, say 0.5 c.c. of 1-1000 solution, the doubling or tripling of this dose

Read before the Physicians Chest Disease Symposium, Los Angeles, California, January, 1950. From the Medical Service of Wadsworth General Hospital, Veterans Administration Center, and the Department of Medicine, School of Medicine, University of California at Los Angeles.

Reviewed in the Veterans Administration and published with the approval of the Chief Medical Director. The statements and conclusions published by the author are the result of his own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

may well give dramtic relief, or the same dose the patient has been taking without effect may give relief if given intravenously instead of intramuscularly. As soon as possible, oxygen by mask, catheter or tent should be administered.

If the patient is much wrought up, a sedative is important, but ordinarly, the patient has been without sleep for some period of time and a slight relief of symptoms will allow him to relax and go to sleep. While morphine is one of the best sedatives for emergent conditions in general, it is strongly contra-indicated in asthma because of its depressant effect on the respiratory center..I have seen at least three patients die as a result of receiving a quarter of a grain of morphine during a severe attack. It relaxes them and markedly slows their respirations at a time when they should be struggling for breath. Therefore, one of the quicker acting barbituates is the sedative of choice

SLIDE 5 B. Spontaneous Pneumothorax
due to: Ruptured emphysematous bleb or Ruptured pleural adhesion or Visceral pleura needle tear
Resulting in:
Atelectasis
Shift of mediastinum
Rx: Needle intercostally on side of pneumothorax

Most cases of spontaneous pneumothorax are not dire emergencies, though they are frightening to the patient; however, a small portion whether they be due to ruptured emphysematous blebs or to torn pleural adhesions, may become extreme emergencies because of the great and rapid shift of the mediastinum that can occur. To this group, one should add those occasions where a needle has been inserted into the chest for diagnostic or therapeutic purposes and has cut a half moon in the visceral pleura. In these instances, the small pleural nick may act as a valve opening on inspiration and closing on expiration, thus allowing air to pass through the bronchus into the pleural cavity but not back. This pump-like action can compress the lung completely and can displace the mediastinum toward the opposite side, partially compressing the opposite lung and placing enough torsion on the great vessels to embarrass not only respiration but circulation.

If such occurs, the immediate and urgent treatment is the insertion of a needle, preferably about 18 calibre, into the thorax on the side of the pneumothorax. This will allow the air under pressure to come out. It is important to remember that the valve effect will exist and this needle may have to be left in place for 24 to 48 hours. A piece of rubber from a rubber glove may be tied over the adapter end of the needle loosely so that it will act as a valve counter-acting the pleural valve, allowing air to come out of but not to enter the pleural cavity. Such a patient should be watched closely for re-accumulation of the pneumothorax until the pleural wound is healed

SLIDE 6 C. Pneumonia
Rx. 1. Antibiotics—large doses
2. Parenteral fluids
3. Oxygen
D. Pulmonary Edema due to Inhaled Gases
Rx. 1. Epinephrine
2. Oxygen

Occasionally one sees a pneumonia for the first time when the patient is in extremis or almost so. Bacterial studies may or may not be available, but the patient very likely has a pneumococcal septicemia in addition to his pulmonary involvement. Large doses of antibiotics are indicated immediately; oxygen as quickly as it can be obtained and parenteral fluids as quickly as they can be started. Penicillin is still the antibiotic of choice in most bacterial pneumonias, the exceptions being tuberculous pneumonia and pneumonia due to Friedlanders bacillus. These two infections are most susceptible to Streptomycin. 600 thousands units of procaine penicillin twice daily is an adequate dose for a patient with pneumococcal pneumonia and bacteremia (and this would include 95% of desperately ill pneumonia patients). 5 million units of aqueous potassium penicillin daily would be necessary if the pneumonia were due to a staphylococcus. If marked improvement has not occurred in 24 hours, streptomycin and sulfadiazine therapy should be instituted; streptomycin dosage being 0.5 grams every 6 hours and sulfadiazine 4 grams initially followed by one gram every 6 hours. With the advent of the broader spectrum antibiotics such as aureomycin, chloromycetin and terramycetin comes the possibility that these may prove to be the antibiotics of choice in pneumonias of unknown etiology. Aureomycin and terramycetin can be given intravenously and the dosage is 500 mg. every 12 hours for either of these drugs.

Occasionally, chemically irritating gases may be inhaled to the point of giving pulmonary edema. Such was the case in an eastern clinic disaster, following the explosion and burning of their file of old type X-ray films. The pulmonary edema was sudden and severe though delayed, and accounted for many of their deaths. It can occur in a sudden severe exposure to sulphur dioxide fumes or chlorine or other gases used commercially.

Treatment consists of administration of epinephrine and oxygen under positive pressure.

SLIDE 7 E. Hemoptysis
Rx. 1. Rest—sandbags
2. Morphine
F. Emphysema
Rx. 1 Oxygen

Usually, hemoptysis is a real emergency to the patient—more than it is to the physician. However, it needss quick and careful handling to minimize its after effects and occasionally to save a life. This consists of absolute rest with the affected side held in a slightly lower position than the unaffected. Sandbags or soft heavy objects should be used to immobilize this side. The reason for keeping the affected side lower is to prevent insofar as possible the accumulation of blood in the non-affected side. Toward this end, the usual position for postural drainage may be indicated. Morphine will allay the patient's fears, quiet him and slow down respiration. However, it must be used judiciously, being careful not to abolish or severely depress the cough reflex. If the bleeding continues, it may be necessary to institute pneumothorax on the affected side.

The patient with severe emphysema, with a vital capacity of less than 1000, has very, very little pulmonary reserve and may become an emergency under situations which would hardly disturb normal people. A cold, a slight asthmatic attack, irritating atmosphere causing coughing, or a fever may indeed make a severely emphysematous person a desperately ill person. Oxygen is the primary treatment, but remember that a severely emphysematous patient takes to oxygen as to a drug. He quickly becomes dependent upon it psychologically and once started, he wants to be near it the rest of his life.

There are the emergent situations due to pathology in the mediastnum.

SLIDE 8 II. MEDIASTINUM
A. Tumor with vena caval pressure
B. Mediastinitis
C. Emphysema
D. Sudden gross shift
E. Ruptured esophagus
F. Status thymicolymphaticus

SLIDE 9
A. Tumor with vena caval pressure (usually lymphosarcoma or Hodgkin's group)
1. X-ray
2. Nitrogen mustard
B. Mediastinitis
1. Antibiotics
C. Emphysema
1. Expectant
2. Antibiotics

A tumor of the mediastinum: sarcoma or lymphosarcoma, is obviously not an emergency if noticed early, but a doctor may not be called until the time when the pressure has reached the point where either the superior vena cava or the inferior vena cava is very much obstructed. There will be severe venous distention in the upper or lower or both parts of the body, and with little blood returning to the heart the pulse will be weak and rapid. The only help that can be given aside from oxygen is a rapid destruction of the tumor mass. This has to be accomplished by x-ray or nitrogen mustard. On the whole, nitrogen mustard acts more quickly but its effect does not last as long.

Mediastinitis can be due to several causes, the most common being infected hilar glands that have ruptured into the mediastinum. Other possibilities would include penetration of infected material from the esophagus. Treatment is immediate institution of antibiotic therapy and the choice of antibiotics rests with the decision as to whether it is a ruptured tuberculosis gland, a pyogenic infection or leaking esophagus.

The treatment of emphysema of the mediastinum is primarily expectant. Such an emphysema will probably be associated with emphysema in the upper part of the thorax. The pressure is not likely to become dangerous, but with air in the tissues, infection may result and penicillin or other antibiotics should be used prophylactically.

SLIDE 10
A. Sudden Gross Shift
(due to pneumothorax)
1. Treatment of pneumothorax

B. Ruptured Esophagus
   1. Expectant
   2. Surgical

C. Status thymicolymphaticus

Sudden gross shift of the mediastinum grave enough to become an emergency is due to sudden pneumothorax which has been discussed.

Ruptured esophagus: The treatment of a ruptured esophagus is primarily surgical and I believe Dr. Byron will discuss it with you. However, it may occur during gastroscopy if the patient has a carinoma that involves the upper end of the stomach. We had one such patient at our hospital and he was treated with antibiotics and in a sense, expectantly. He recovered from the small tear and resultant mediastinitis rather uneventfully.

Status Thymicolymphaticus: If there is such a condition, and there are many who believe so, the only treatment is preventive and consists of x-ray therapy directed toward the thymus when it is found to be large. The emergencies unfortunately consist of finding the infant dead.

SLIDE 11 III. HEART

A. Coronary Occlusion
B. Acute Heart Failure
C. Cardiac Tamponade
D. Steering wheel injury
E. Elevated Blood Potassium level
F. Low Blood Potassium level
G. Paroxysmal (supraventricular) Tachycardia

Although the heart is in the chest, it may not have a place in this chest symposium. It must, however, be considered in the differential diagnoses and a chest emergency will certainly include many instances where the heart is the major organ at fault, so it will be considered briefly.

SLIDE 12

A. Coronary Occlusion
   1. Rest
   2. Morphine
   3. Oxygen
   4. Papaverine
   5. Anticoagulants
   6. Small blood transfusions

The primary treatment in coronary occlusion is aimed at resting the heart, improving its blood supply if possible, and theoretically at least, at the prevention of the spread of the thrombus. Bed rest is probably more complete if the upper part of the body is propped up to an angle of 30 degrees or so. Morphine is important for relief of the pain, to help control the shock and to allay the anxiety associated with the attack. Oxygen will make the circulating blood more efficient. There is some argument as to the use of coronary vessel dilators, one school feeling that dilation may cause considerable slowing down of the blood flow to create further thrombus formation; the other school believing the larger the vessels are, the better the heart will be nourished and the smaller the dead, infarcted area will be. According to your choice, Papaverine, Aminophylline and Atropine may be used Anti-coagulents have been urged upon us rather strenuously during the past three or four years and I still think if I had a coronary occlusion I would like to receive anti-coagulents; however this pendulum will start swinging back after a while and one might hazard the guess that five years from now they will be used cautiously and in moderation.

If the occlusion is due to hemorrhage under a small plaque in one of the coronary vessels, it is difficult to see how an anti-coagulent could do anything but harm. If it is due to a thrombus within the vessel, its indication would seem obvious. If a primary occlusion is followed in a day or two by a secondary one, anti-coagulents are indicated, as this suggests an extension of the clot. Heparin acts immediately; dicumarol may take a day or two to produce its effect. Dicumarol should not be given if the prothrombin time cannot be followed carefully.

Recent studies indicate that associated with the shock seen in severe coronary occlusion, there is a decrease in blood volume. Small transfusions are, therefore, useful in combating this state, and if the shock is severe, these transfusions should be given arterially rather than venously.

SLIDE 13

B. Acute Heart Failure
   1. Phlebotomy
   2. Oxygen
   3. Digitalis parenterally or I.V.
   4. Morphine
   5. Aminophyllin

C. Cardiac Tamponade (in paricarditis)
   1. Pericardial tap

D. Steering Wheel Injury
   1. As coronary occlusion

If a patient in acute heart failure has pulmonary edema, an emergency exists. Ascites or ede-

ma in the extremities or sacral region is not an emergency. In moderate to severe pulmonary edema, a phlebotomy is indicated even if it is found necessary to give a transfusion again at a later time. A so-called tourniquet phlebotomy or bloodless phlebotomy, the placing of a tourniquet high on each of the four limbs, is a procedure which can be done quickly and easily and which often produces dramatic results. It will perhaps suffice of itself and will at least give an indication of the usefulness of a real phlebotomy.

Oxygen is again important. Immediate adequate digitalization of the patient parenterally or intravenously is likewise important. Morphine in small amounts will bring about real rest and relaxation, and again, vaso-dilators are useful. I prefer Aminophyllin but most of the younger men in our hospital seem to prefer Papaverine.

Associated with pericarditis, one must always keep in mind a pericardial effusion; weak, distant heart sounds, weak rapid pulse and low pulse pressure are indications pointing towards this condition.

The treatment is of course the removal of the effusion immediately by pericardial tap.

Following a mild collision, the driver of a car usually receives a fairly severe blow on his chest from the steering wheel. This can, without fracturing the ribss, produce a contusion of the heart which will give electro-cardiograph changes similar to those found in a coronary occlusion. The treatment of this condition is essentially the same as that of a mild to moderate coronary occlusion, with an adequate period of rest. The prognosis of course is different for there is not necessarily an implication of diseased blood vessels, and the patient need not expect a recurrence.

SLIDE 14

E. Elevated Blood Potassium
(Due to severe depletion of chlorides)
1. Saline solutions

F. Low Blood Potassium
(At end of Diabetic Coma)
1. Potassium chloride I.V.—slowly

G. Paroxysmal (supraventricular) Tachycardia
1. Vagal Stimulation
(danger in older people)
2. Morphine I.V.
3. Quinidine

In severe renal disease with salt depletion through the kidneys, potassium may be pulled out of the cells and be found present in the blood in dangerously high amounts. A bizarre electrocardiogram is produced, usually showing markedly deformed QRS complexes and T waves and little inconspicious P waves. This can end in cardiac arrest. The main treatment if any is to replace as quickly as possible the lost sodium chloride to enable the potassium to return to the cells.

At the end of a diabetic coma when the acetone has disappeared from the urine and blood sugar levels are normal or approaching normal, and one expects the patient to do well, occasionally patients will suddenly take a turn for the worse and die. In this instance, the potassium in the blood has gone into the cells with the glucose and with the aid of dilution has left the blood level too low. Ten grains of potassium chloride given intravenously over a period of a half an hour should not throw the patient into the hyperkalemic state and should correct the hypo-kalemic state.

Paroxysmal supraventricular tachycardia may at times become an emergent state. You are all familiar with the immediate means of controlling this by vagal stimulation, such as massage of the carotid sinus and pressure on the eyeball. With people over 50, this method should be used with extreme caution as it occasionally produces a hemiplegia, sometimes permanently. When it is used, only one side at a time should be stimulated. If the attacks are frequent, quinidine or digitalis should keep them under control, but if they occur at intervals of approximately a year, it is more logical to treat them as they occur. Morphine intravenously can relieve these attacks rapidly but does not do so consistently.

SLIDE 15 1V. BLOOD VESSELS

A. Pulmonary embolism
B. Dissecting Aneurysm
C. Ruptured Aneurysm
D. Ruptured Esophageal Varix
E. Fat Embolism

SLIDE 16

A. Pulmonary Embolism
1. Papaverine
2. Oxygen
3. Anticoagulents
4. Search for source

B. Dissecting Aneurysm

1. Morphine
2. Rest

C. Ruptured Aneurysm
1. Morphine

Pulmonary embolism is too often thought of as a fatal complication of an operation. It is however, a fairly common occurrence following thrombophlebitis, phlebothrombosis, endocarditis, carcinomatosis, etc. The size of the embolus and its location determines the outcome. However, in borderline cases, certain emergent measures may be instituted. Because there is edema associated with the obstruction of the vessel, there is room for rapid improvement if the patient can be tided over with oxygen and vasodilators. The second step is directed towards the prevention of further emboli either by use of anticoagulents or venouss ligation.

In dissecting aneurysm, the odds are very much against both the patient and the physician. However, patients have lived for years following a dissection and it is always possible that the final dissection may be into the main trunk of the vessel rather than out through the adventitia, so treatment should be given.

Treatment should aim at rest and keeping the blood pressure down, and toward this end, morphine is about the most useful drug.

A ruptured aneurysm is invariably fatal; however, the pain is excruciating and morphine is certainly indicated in large doses while it is rupturing.

SLIDE 17

D. Ruptured Esophageal Varix
1. Pressure on varix
2. Morphine
3. Transfusion
4. Surgery

E. Fat Embolism
1. 50% glucose
2. Purified Albumin
3. Adrenalin
4. Oxygen

If the patient lives long enough, the treatment of a ruptured esophageal varix will certainly fall into the field of surgery, and I am sure Dr. Byron will cover it. There are, however, two or three procedures that the first physician to arrive on the scene should institute. If the blood pressure is still up, morphine should be given. Transfusions are indicated for replacement purposes. If a Miller-Abbott Tube with bag is available, this should be passed into the stomach, the bag blown up and the tube retracted thuss exerting pressure on the esophageal gastric junction, which is the region of most frequent hemorrhage. We have had five experiences in our hospital where the bleeding was brought under control by that method. Topical thrombin may be used in association with this.

Fat embolism is a diagnosis well worth remembering and the second thing to remember about it is that it is apt to present itself clinically three days after the fracture which precipitated it. This is due to the fact that the fat itself often does not obstruct enough vessels to cause respiratory embarrassment, but on breaking down into fatty acids it produces edema which adds to the pathologic picture and causes acute respiratory embarrassment, or in the case of the brain, coma. 50% glucose, purified albumin, adrenalin—all are agents aimed at combatting the edema. Oxygen will help combat the anoxemia that must result from this obstruction to the smaller arteries.

SLIDE 18

V. THE DIAPHRAGM

A. Rupture through of a subdiaphragmatic abscess
1. Postural drainage
2. Suction
3. Antibiotics

VI. THE BRAIN

A. Hysteria
1. Treat the family first

There are a number of chest emergencies associated with the diaphragm, but they come primarily under surgical emergencies of the chest. However, the rupture through of a subdiaphragmatic abscess, such as an amoebic liver abscess might be considered a medical emergency. If small, it may occur with very little distress to the patient. If large, the patient will certainly become alarmed over the amount of pus that he is forced to cough up.

Both postural drainage and suction will help to remove this pus and antibiotics are certainly indicated to prevent a secondary pneumonia.

The Brain: I place this organ in the present category because when I was in practice, about half of the so-called medical chest emergencies on which I was called out were hysterias. If it is a simple case of hyperventilation with tetanic contractions, the picture may be obvious, but don't belittle the power of the emotions in simulating organic disease, and if you feel it is hysteria, treat the family first.

CLIMATE AND RHEUMATIC DISEASES*

BY HARRY E. THOMPSON, M.D., F.A.C.P.
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The relationship of climate to rheumatic diseases has received attention of many investigators. Certain studies during and after the war have clarified some of the problems of the effect of climate on one of the rheumatic diseases—Rheumatic Fever. In this paper, some of these studies will be reviewed. Also to be reported is a survey of the incidence of Acute Rheumatic Fever among the resident and native** population of a Southwestern city. From this area the incidence of recurrences of Rheumatic Fever will be presented. For these purposes, data were received from the following sources: (a) Six physicians—four Pediatricians and two Internists, (b) The Veterans Administration Hospital, an d(c) The Federal Prison Camp, all in the same locality.

Two other rheumatic diseases, Rheumatoid Arthritis and Degenerative Joint Disease will be considered. Reports on the effect of meteorological changes on 112 cases of Rheumatoid Arthritis and 34 cases of Degenerative Joint Disease will be summarized. Further observations of the incidence of acute and chronic Rheumatoid Arthritis in the native and resident population, based on a study of 659 cases will be reported.

I. RHEUMATIC FEVER

Rheumatic Fever will be considered first, because in this disease, there appears to be no doubt that the effect of climate, the incidence of Hemolytic Streptococcic infections and other etiological factors are closely related. Interesting reviews (1, 2) have appeared concerning the effect of geography and climate on predisposing factors, governing the incidence of Rheumatic Fever. Comparisons were made of the hospital admission rates and analysis of necropsy material from various cities. Table I exhibits the incidence of Rheumatc Fever or Rheumatic Heart Disease in children, based on hospital admissions. It is noted that the percentage falls from North to South. A similar difference in the incidence of Rheumatic Heart Disease based on necropsy studies is exhibited in Table II. Comparisons were also made of the incidence of Rheumatic Fever among comparable groups during the last war. It became evident that marked differences exist between the frequency of Rheumatic Fever in the North as compared to the South. Also certain areas ,the Rocky Mountain area, the Great Lakes and the Midwest Area exhibited a high incidence as compared to a low incidence of the South.

Since Southern Arizona is an area of low incidence of both Group A, Hemolytic Streptococcic infections and Rheumatic Fever, the results of the following survey may be of interest. The survey reported by six physicians (3, 4) included: (a) Acute Rheumatic Fever arising in the native and the resident population and (b) All cases of Rheumatic Fever. These findings are condensed in Table III.

The number of Acute Rheumatic Fever patients was reported as follows: One, two, eighty, twenty, zero and two cases. The times of observation were three, five ten, ten, eleven and eleven years respectively, thus over a total period of fifty years, one hundred and five acute Rheumatic Fever patients were seen among the native population.

Recurrent Rheumatic Fever reported by the same physicians was as follows: recurrences were noted in one, zero, forty, zero, five and

TABLE I

THE PERCENTAGE INCIDENCE OF RHEUMATIC FEVER OR RHEUMATIC HEART DISEASE, IN CHILDREN*, BASED ON HOSPITAL ADMISSIONS

City	Percentage
Philadelphia	5.8%
Portland, Oregon	3.5%
Cincinnati	2.7%
Dallas	0.8%
Los Angeles	0.69%

*From Rheumatism and Arthritis, Ann. Int. Med. Jan. 1948

TABLE II

THE INCIDENCE OF RHEUMATIC HEART DISEASE BASED UPON NECROPSY STUDIES*

City	Total Cases	Rheumatic Heart Disease	Percentage of Total
Boston	8,300	456	5.5
Atlanta	1,754	61	3.5
Galveston	2,463	22	0.9
New Orleans	16,121	102	0.63

*From Rheumatism and Arthritis, Ann. Int. Med. Jan. 1948

*Presented at the first Arizona Regional meeting of The American College of Physicians at Phoenix, October 22, 1949.
**Native—defined as a lifetime resident.

two cases or a total of forty-eight recurrences out of 1,141 cases studied. The recurrence rate was 4.2 percent for this series. No chemical prophylaxis was used.

The Veterans Administration Hospital (5) reports (Table IV) for a period of twenty-one months, January 1948 to October 1949, a total of 2,938 admissions, 147 or five percent were rheumatic diseases, of this number; one or 0.68 percent were Acute Rheumatic Fever and two admissions or 1.36 percent (both for the same patient) were recurrent Rheumatic Fever.

Finally, from the Federal Prison Camp, (4) a work camp, no cases of either Acute or Recurrent Rheumatic Fever were observed among 6,000 inmate admissions over a period of thirteen years.

From this review and these observations, it appears that the following remarks are warranted: one, that the incidence of Rheumatic Fever is related to both meteorological factors and geographical location; two, that Acute Rheumatic Fever occurs in the area reported but it is of low incidence; three, that Acute Rheumatic Fever appears to be less frequent in the natives, as compared to the other residents. These differences observed may be due to factors other than those that relate to climate and location; four, that since recurrences of Rheumatic Fever are frequent, i.e. an estimated eighty-five percent in children and fifty percent of all cases, the low percentage reported here appears to be due to conditions characteristic of the area and five, that the reported absence of Rheumatic Fever among prisoners apparently is related to environment in addition to geography and climate.

II. RHEUMATOID ARTHRITIS

Next, Rheumatoid Arthritis will be considered in relation to climate. There is again an abundance of material available in the literature. (1, 6) First a patient's ideas about weather and arthritis may be of interest. A patient who has had a Rheumatoid Arthritis and who has written an excellent book* for patients with the disease states, "There are few medical subjects about which there is more misinformation or lack of understanding, than the effect of weather upon arthritic sufferers. Unforunately, some medical practitioners seem to believe that in a warm, dry climate, improvement or recovery from the disease without medical aid is possible, even likely. My research supports no such view. Good weather alone will cure no ones arthritis! That arthritics become increasingly uncomfortable both mentally and physically with the approach of cool, damp, cloudy weather, but feel better when warm, dry, sunny weather returns, is a fact well known to anyone who has had this disease or has associated with many who do. The simple facts about the effect of weather upon arthritis should be made available to millions who suffer with the disease. Arthritics who can continue to live in a warm, dry, sunny climate and who intelligently and determinedly work for recovery under able medical management, seem to enjoy greater physical and mental comfort, make better progress, and have the best chances of recovery."

Observations on the effect of meteorological changes on patients with Rheumatoid Arthritis,

*Managing your Arthritis, Dorrance & Company, Philadelphia 1947.

TABLE III

REPORT OF PHYSICIANS EXHIBITING THE ACUTE RHEUMATIC FEVER OBSERVED IN NATIVE AND RESIDENT POPULATION AND THE NUMBER OF RECURRENCES

Reporting Doctor	Time of Observation	Acute Rheumatic Fever		Recurrences Noted on All Cases
		Natives	Other Residents	
J. R. Sickler	3 years	1	25	1
M. Semoff	5 years	2	25	0
B. P. Storts	10 years	80	400	40
H. C. Thompson	10 years	20	400	0
P. W. Holbrook	11 years	0	280	5
H. E. Thompson	11 years	2	11	2
Totals	50 years	105	1141	48

Recurrence Rate Percent 4.2, all cases.

are summarized in Table V. You will note that out of 112 chronic rheumatoid arthritic patients, ninety-two or eighty-three percent were subjectively worse with meteorological change, while nineteen or seventeen percent were not.

Observations of the incidence of Acute and Chronic Rheumatoid Arthritis among the native population may be reported as follows: in a review of 659 private patients with Rheumatoid Arthritis, only one native or lifetime resident appeared in this series with a Chronic Rheumatoid Arthritis. Acute or Subacute Rheumatoid Arthritis in natives was seen in four patients of the same series.

Observations on the effect of climate alone on Rheumatoid Arthritis. In this same series of 659 patients no permanent remission of a Chronic Rheumatoid Arthritis, due to climate alone, was observed. Several patients appeared who were markedly benefited.

These observations indicate that since approximately eighty-three percent of the Chronic Rheumatoid Arthritics are affected adversely by meteorlogical change, these are the patients who will be subjectively improved in a warm, dry climate. They are more amenable to treatment in such a climate. This group particularly are the patients in whom a change of climate may be indicated. Investigators in Sweden (7) have noted the beneficial effect of a controlled "hot dry microclimate" in patients with Rheumatoid Arthritis.

These observations also indicate that the extremely low incidence of both Acute and Chronic Rheumatoid Arthritis, among the native population is related to climate, geographical and other undetermined factors.

Again that since remissions in Rheumatoid Arthritis, due to climate alone are rare, medical management is essential. It is essential since in a previous study (8) of 345 patients with Rheumatoid Arthritis, it was found that approximately sixty percent had deformities, most of them preventable, which occurred during the time the patients were not under medical care. Unfortunately many patients are now waiting for the "NEW DRUGS" before seeking such care. They should understand, as all patients should with Rheumatoid Arthritis, that without proper supervision, progression of the disease and crippling are likely to occur.

III. DEGENERATIVE JOINT DISEASE

Degenerative Joint Disease will be briefly considered. Most of the things that were observed concerning Rheumatoid Arthritis apply to Degenerative Joint Disease. The effect of cilmate on these patients is shown in Table V. Listed there are thirty-four cases of Degenerative

TABLE IV

THE INCIDENCE OF ACUTE AND RECURRENT RHEUMATIC FEVER BASED ON HOSPITAL ADMISSIONS* FOR TWENTY-ONE MONTHS

	All Cases	Rheumatic Diseases	Acute Rheumatic Fever	Recurrent Rheumatic Fever
Total Admissions	2938	147	8	2 (same Patient)
Percentage of Total Admissions		5%	0.034%	0.068%
Percentage Total Rheumatic Diseases		100%	0.68%	1.36%

*Veterans Administration Hospital, Tucson, Arizona. January 1948—October 1949.

TABLE V

THE "WEATHER SENSITIVITY" IN 112 PATIENTS WITH CHRONIC RHEUMATOID ARTHRITIS AND 34 PATIENTS WITH DEGENERATIVE JOINT DISEASE

Disease	No.	Weather Sensitivity			
		Yes		No	
Rheumatoid Arthritis	112	93	83%	19	17%
Degenerative Joint Disease	34	30	88%	4	12%
Totals	146	123		23	

Joint Disease. Thirty or eighty-eight percent were definitely sensitive to weather changes, while four or twelve percent were not. A warm, dry sunny climate appears to be beneficial, particularly in those patients who are weather sensitive. The benefits derived from this type of climate seem to be subjective in character, therefore a comprehensive medical plan of treatment (9) should be followed in these patients with Degenerative Joint Disease.

CONCLUSION

In conclusion it has been pointed out that all three of these rheumatic diseases, Rheumatic Fever, Rheumatoid Arthritis and Degenerative Joint Disease have some relationship to climate.

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BALL THROMBUS OF THE MITRAL VALVE

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Ball thrombus of the heart is mentioned so frequently as a complication of mitral stenosis that one is surpised in looking at the literature to find so few authentic cases reported. Still less often has the correct diagnosis been made ante-mortem. Evans (1) discusses a case and submits photographs of the pathologic specimen. Abramson (2) in his very exhaustive monograph of 1924 collected only 19 cases from the literature of ball thrombi and added a case of his own. David Spain (3) reported a case in which a correct ante-mortem diagnosis had been made. Kaplan (4) reported an immense pedunculated thrombus in one auricle, 7 x 9 x 5.5 cms. in size, attached to the lateral wall over a 2.5 x 1.2 cms, area and almost completely covering the mitral valve.

During 1949 I made such a diagnosis antemortem, which was proven by an autopsy. In 1950 I saw another case, almost identical clinically, in which an autopsy, unfortunately, could not be done.

After reviewing the literature, because of the apparent rarity of this striking clinical entity, the following two cases are reported.

CASE ONE

Miss Helen A., nurse, aged 37 years, who had had acute rheumatic fever in 1939, was first seen by me on November 20, 1947 with severe cardiac decompensation and auricular fibrillation. An electrocardiogram showed extreme right axis deviation with tremendous ST2-3 coving and inversion suggestive of extreme coronary insufficiency. A standard cardiac regimen was followed and she gradually improved. On December 16, 1947 she suddenly developed symptoms of a cerebellar lesion. She was admitted to a hospital and given dicumarol, quinidine, papaverine, digitalis and mercuhydrin. The cardiac statuss appeared to be well compensated. On March 12, 1948 she was asking if she could resume work because she felt fine.

The pulse rate was 64 per minute and the apex rate 72 per minute. There was no cardiac dilation. After careful restudy she was permitted to begin working half days to determine what she could tolerate. On March 20, 1948 she got up to go to the bathroom and suddenly collapsed, falling to the floor unconscious, I saw her one-half hour later in typical extreme cor pulmonale, completely unconscious and deeply cyanotic. In view of the clinical picture, a diagnosis of a ball-valve thrombus obstructing the mitral valve was made. She was taken to a hospital, where she expired that evening. At the autopsy the mitral orifice was shrunken to "about the size of radial artery" and was occluded by a "ball thrombus about 4 x 1 x 1 cm., firm, and surface uniformly smooth and glistening." In the auricular appendage there was a roughened area from which the thrombus had become detached to lodge in the extraordinarily narrowed mitral orifice.

CASE TWO

Mrs. Anne W., aged 25 years, was first seen on September 27, 1949 giving a history of having had rheumatic carditis at the age of 15 years. A therapeutic abortion had been performed two

years previously because of the heart condition. There was a marked double murmur heard at the apex. The basal metabolic rate was plus 43 per cent. The erythrocyte count was 3,130,000 per cu. mm. An electrocardiogram showed a marked right axis deviation-sinuss rhythm, rate only 85, and the PR interval was .20 seconds. She was given propyl thio-uracil, iron and liver tablets, hi-caloric diet, and rest. On October 19, 1949 her weight was 107 pounds and the erythrocyte count was 4,370,000. On November 13, 1949 the basal metabolic rate was minus 19 and murmur was much less harsh. On December 27, 1949 her weight was 103 pounds, so she was again given propyl thio-uracil. The heart was essentially unchanged from the last examination. She was cheerful, happy about her job and feeling quite well, planning "a big time for New Year's Eve."

On January 6, 1950 at 6:30 A. M. she arose as usual to get ready to go to work. She collapsed suddenly in the bathroom as she was putting on make-up. Her sister picked her up and dragged her to bed. When I saw her a short time later she presented the typical picture of extreme cor pulmonale. She was rushed to the hospital with a tentative diagnosis of ball thrombus. A bronchscopic aspiration of the edema fluid was done, 100% 0_2 was given plus all the usual stimulants, but to no avail and she went into anoxic shock and respirations ceased at 3:00 P. M. but the heart beat for another five minutes. An autopsy was not performed. However, I have no doubt in my mind that this case clinically is identical with the first case. The syndrome is unique in its dramatic onset and, once seen, it can never be forgotten.

COMMENT AND SUMMARY

Two cases of ball-thrombus of the mitral valve are presented. Only one, however, was absolutely proven by autopsy. The literature is briefly summarized. It seems that the paucity of cases previously reported may be due to failure to recognize this syndrome. The essential clinical features are presented.

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BASIC SCIENCE SEMINAR

THE METABOLISM OF CHOLESTEROL WITH SPECIAL REFERENCE TO ATHEROSCLEROSIS

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Presented at the Basic Science Seminar, Tucson Medical Center
Tucson, Arizona, November 27, 1950

The purpose of this paper is to summarize the few known facts and the multitude of theories concerned with the metabolism of cholesterol, with special reference to its relationship to atherosclerosis. Limited time necessitates the omission of some interesting yet unessential material as well as the abbreviation of some more important data.

The presentation of this subject is timely as recent experimental work has given promise of a better understanding of the metabolism of cholesterol and a potential basis, perhaps, of a means to combat the great killer, arteriosclerosis.

The subject will be discussed in relation to a diagram (Fig. I) showing the passage of cholesterol through the body, including sources, metabolism within the body, and excretion.

First, however, an understanding of the nature of the compound, cholesterol, is needed.

CHEMISTRY OF CHOLESTEROL

General Considerations—There is in nature a large group of chemically related compounds called *steroids*. These include the sterols, of which cholesterol is a member, the bile acids, cardiac aglycones, sex hormones, adrenal cortex hormone, antirachitic vitamin D, saponins, toad poisons, and certain carcinogenic compounds. The steroids have as the basis of their chemical relationship the cyclopentanophenanthrene nucleus.

The *sterols* are specifically those steroids which have the characteristics of a monohydroxy alcohol. The term *sterol* is derived from the Greek, *steros*, a solid, and *ol*, an alcohol. Thus,

a solid alcohol. *Chole,* meaning bile, is prefixed to give the term *cholesterol,* the solid alcohol derived from bile. Sterols are essential constituents of all protoplasm, both animal and plant. They occur in both the free state and in the form of esters by their combination with higher fatty acids. It is of interest to note that a minute difference in the chemical structure of two sterols gives them a vastly different physiological activity.

Cholesterol—Cholesterol has been known to be the most common constituent of human gallstones for many years. However, it was not until the early 1930's that its structural formula was identified. It is present in all cells of animals as well as the blood and interstitial fluids, apparently most abundant in the white matter of the central nervous system. The adrenal glands also contain appreciable amounts.

Cholesterol is a white, waxy solid which is soluble in ether, alcohol, and acetone, but only slightly soluble in water. Its melting point is 149° C. Chemically it has the empirical formula $C_{27}H_{46}O$, and the structural formula shown in Figure II. It has a hydroxyl group on carbon 3 and one double bond between carbons 5 and 6. The cholesterol nucleus has eight centers of asymmetry with a theoretical possibility of about 240 isomers. In practice, however, only carbons 3 and 5 are involved.

Cholesterol, as well as other sterols, when treated with strong acids under dehydrating conditions produces various color reactions. These have been used for colorimetric quantitative estimation of cholesterol. The Liebermann-Burchard method entails the treatment of the sterol with chloroform, acetic anhydride, and concentrated sulfuric acid to produce a green color, which can be measured colorimetrically.

A second method for determining the presence of cholesterol involves its reaction with digitonin. These two substances react to form an insoluble precipitate of cholesterol digitonide which can be measured gravimetrically. The Sperry Schoenheimer method is such a procedure.

We may now reexamine the diagramatic representation of cholesterol metabolism (Fig. I).

Briefly, the source of cholesterol is twofold, exogenous, from the diet, and endogenous, via the bile and intestinal secretions, mixing within the lumen of the small bowel. Here the cholesterol is absorbed into the blood by way of lymphatics and blood capillaries. Unabsorbed, as well as excreted cholesterol, enters the lumen of the colon and is excreted. The blood, liver, and tissues are so reciprocal that they may receive or contribute cholesterol.

SOURCES OF CHOLESTEROL

At one time it was thought that dietary intake was the only source of the cholesterol found in the body. It was not until 1925 that the synthesis of cholesterol by the body was established (1, 2).

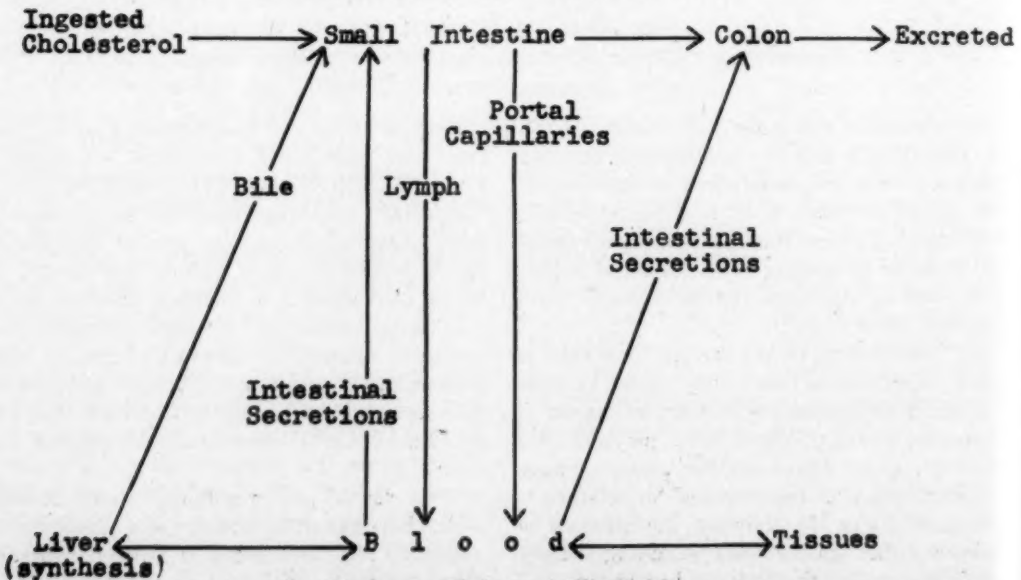

Figure I: Cholesterol Metabolism.

Exogenous–Diet–Since only those foods of animal origin contain cholesterol, we need not concern ourselves with a discussion of other food substances. It should be noted, however, that the plant sterols have chemical reactions very similar to those of cholesterol and that older food tables, which list cholesterol in vegetable fats probably are in error because of such reactions. It was once thought that animals were able to transform plant sterols into cholesterol, but it now is recognized that plant sterols are not absorbed by the body.

The cholesterol content of various foods is given in Figure III. From these data we note that eggs, oysters, butter, and the organ meats contain the greatest amounts of cholesterol on a mgm. per 100 gm. basis, while whole milk has an insignificant amount. However, to get a true picture of dietary intake, one must refer to the mgm. of cholesterol in average portions of foodstuffs. Thus we see that milk may become a more significant factor in cholesterol intake. Eggs, although still a potent factor, are brought far below the levels of beef brains and hearts. However, eggs are consumed much more frequently by most people.

Endogenous–Synthesis–The work of Channon (1) and that of Randler and Knudson (2) first showed that rats maintained through two or more generations on a sterol-free diet had significant amounts of cholesterol in their bodies, and accumulated more during growth. Since then, other investigators have confirmed the synthesis of cholesterol in the animal. It was shown that a man on a low-sterol diet excreted a greater quantity of sterols than he had ingested. Heavy hydrogen (deuterium) studies have indicated not only the synthesis, but also the basic substances from which the body builds the cholesterol molecule.

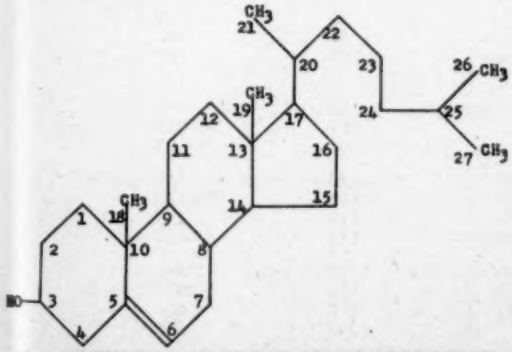

Figure II: Structural Formula of Cholesterol.

Rittenberg and Schoenheimer (4) showed that the cholesterol of mice fed heavy water contained D_2 in proportions indicating that it had replaced one-half of the hydrogen atoms. They concluded that cholesterol was synthesized from small molecules, perhaps those formed in the intermediate metabolism of fats and carbohydrates. Studies by Bloch and Rittenberg (5, 6) indicate that acetic acid was such a small basic molecule. They labeled sodium acetate with D_2, and later with both D_2 and radioactive carbon and recovered cholesterol with these labeled atoms present in both nucleus and side chain. They also demonstrated (7) that any compound which yielded acetic acid during its metabolism contributed to cholesterol synthesis.

The site of the synthesis of cholesterol appears to be in the liver, but other organs have been given credit for this process. These include the adrenals, spleen, thyroid, pancreas, and pituitary. It has been suggested that cholesterol is formed, not by one organ, but by cells of the reticulo-endothelial system. Bills, after consideration of all facts, states that endogenous cholesterol probably originates in the cells in which it is found (8). It has been estimated that approximately 300 mgm. of cholesterol may be synthesized daily by the body.

The endogenous cholesterol is excreted into the small intestine via the bile and intestinal secretions in the form of free cholesterol. To this endogenous cholesterol in the gut is added the cholesterol of the ingested foods, which also is almost completely in the free form.

ABSORPTION OF CHOLESTEROL

The absorption of sterols from the gut is of an extremely discriminate nature. As a small change in structure gives a vastly different physiologic activity to a sterol, so does it render a sterol absorbable or unabsorbable. For example, allocholesterol, a mixture of isomers, and dihydrocholesterol, a saturated form, are excreted almost completely, in the feces (9). Vegetable sterols can not be absorbed by animals. Sitosterol given to rabbits was recovered quantitatively and unchanged in the feces (9). It is of interest that the provitamin D, ergosterol, like other plant sterols is not absorbed, but the active, irradiated vitamin is taken up by the body.

Within the lumen of the small bowel the cholesterol is almost entirely in the free state. That in the thoracic duct is both free and esterified. It follows that the process of absorption

entails esterification of a portion of the cholesterol. Mueller prepared pancreatic extracts which were capable of esterifying cholesterol (10). The responsible enzyme, pancreatic cholesterase, is markedly activated by the bile acids, cholic acid and glycocholic acid, esterifying cholesterol with fatty acids, particularly the highly important unsaturated fatty acids (11). Experiments on bile-fistula dogs have shown that bile is not indispensible for cholesterol absorption. However, fat and pancreatic enzymes are essential. Cholesterol administered to animals on a fat-free diet was recovered quantitatively in the feces (12).

Cholesterol esters enter the epithelial cells of the intestine while free cholesterol is poorly, if at all, absorbed. Some cholesterol must be released from its esters during passage through the intestinal wall, however, since the ratio of free to esterified cholesterol is approximately the same in thoracic duct lymph as in blood, regardless of the state of the ingested sterol.

Many investigators have shown that most of the absorbed cholesterol enters the lymph, but the passage of a portion directly into the portal blood cannot be denied. The rapid rate of removal of cholesterol from the blood, especially by the liver, makes for difficulty in tracing its course. Regardless of the route, the cholesterol eventually finds its way to the blood stream and it is this blood cholesterol that is of prime importance in the pathological changes associated with its metabolism.

CHOLESTEROL IN THE BLOOD

The absorption of cholesterol esters probably is only of minor importance in considering those mechanisms by which fatty acids enter the body. Some short chain fatty acids pass directly into the intestinal mucosa. The rest are phosphorylized in the wall of the intestine to phosphatides, lecithin in particular.

Gubner and Ungerleider (13) stress the importance of a consideration of all of the mechanisms of fat absorption rather than that of cholesterol alone. They call attention to a remarkably constant concentration and division of the various lipid fractions in any individual, suggesting a dynamic interdependence and relationship. This is particularly true of the ratios, cholesterol:cholesterol esters, and cholesterol:phospholipids. Clinically, such interrelationships are important in that one must consider lipid metabolism as a whole rather than cholesterol levels alone. The constancy of these ratios lies in the ability of the liver to regulate the transfer of fatty acids to cholesterol and phosphatides.

The high concentration of hydrophobic, insoluble cholesterol in the blood stream is due to agents which carry it in colloidal suspension. Hydrophilic phospholipids may aid in this. Weak bonded lipo-protein complexes are of more importance. Alpha$_2$ and beta-globulin fractions of serum protein, as well as gamma globulin and albumin, contain both cholesterol and phospholipids in high concentration. This

Food	Cholesterol mg./100 g.	Average Portion	Weight Gm.	Cholesterol mg./Av. Portion
Butter	280	2 pats	14	39
Cheese, American	160	1 slice	28	45
Cod Liver Oil	400	1 tsp.	4	16
Eggs, white	0	1	35	0
Eggs, yolk	2000	1	17	340
Milk, whole cow's (4% fat)	12	1 glass	210	24
Salmon	60	1 c. canned	113	68
Oysters	230-470	6	113	260-531
Shrimp	150	8	68	98
Beef	125	¼ lb.	113	141
Pork	70-105	¼ lb.	113	79-119
Veal	140	¼ lb.	113	158
Chicken	60-90	¼ lb.	113	68-102
Brains, beef	2360	¼ lb.	113	2667
Heart, beef	2110	¼ lb.	113	2384
Liver, calf	360	¼ lb.	113	407
Sweetbreads	280	1 c.	113	316

Figure III: Cholesterol Content of Foods. (3)

globulin-lipid bond may be broken by heparin, forming a protein-heparin compound.

Cholesterol is present in both blood plasma and cells, as it is a normal constituent of all body cells. The amount in the erythrocytes is less than that of the plasma, but on the basis of water content of both, the distribution is equal. Average values for plasma cholesterol range from 130 to 240 mgm. %, and the percentage of this in the free state, a physiological constant under normal conditions, ranges from 20% to 40%.

Such values for cholesterol levels are termed "average" rather than "normal" since there is much variation under so-called "normal" conditions. All of the factors involved are not known at this time, but studies have shown that age and sex are two important influencing factors. Keys (14) correlated age and cholesterol levels in 541 adult males who were free of detectable disease (Figure IV). He demonstrated that there was a progressive rise in total cholesterol levels with age. A plateau was reached at ap-

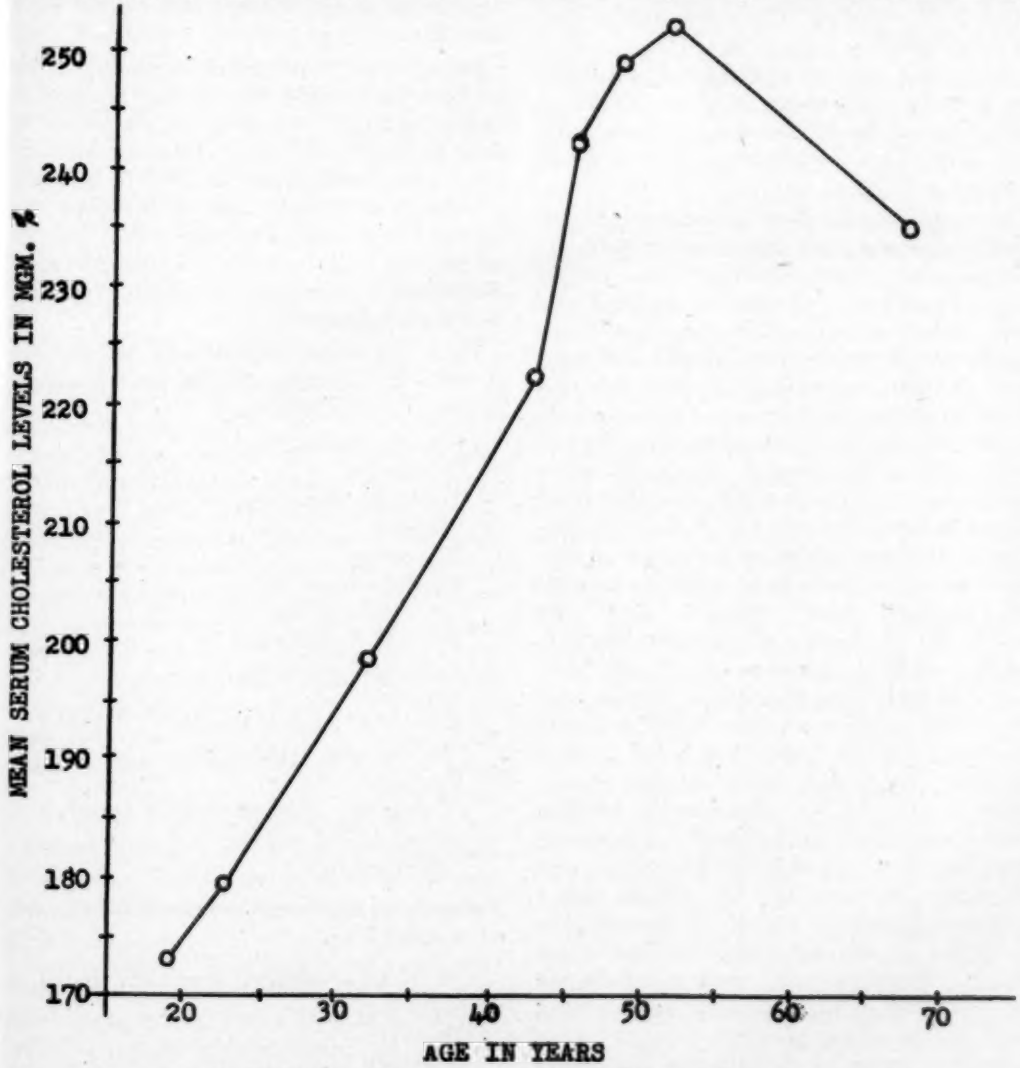

Figure IV: Total Serum Cholesterol Levels at Basal Rest. "Normal" Males. (14)
Age groups: 17-20, mean—19 45-47, mean—46
21-25, mean—22.5 48-50, mean—49
27-35, mean—32 51-55, mean—52.5
39-44, mean—43 63-74, mean—68

proximately 50 years of age, and a slight decline occurred in persons of sixty years. It also has been demonstrated that at birth there is very little cholesterol in the blood, but the level rises rapidly in the first few days of life. The blood level then rises slowly until it reaches adult values by the onset of puberty.

Some observers have found that there is almost invariably a fall in cholesterol levels just before or during the menstrual period. This is usually preceeded or followed by a blood cholesterol level definitely above the average for each individual.

An increase in blood cholesterol is noted during pregnancy, amounting to about 25% above the average at the 30th week. This falls to the original level for the individual about 8 weeks postpartum.

The most obvious factor in the regulation of blood cholesterol levels might appear to be the dietary intake. Such is the case to a limited degree immediately following the ingestion of a fatty, cholesterol-rich meal, but the rise is both trivial (5% of ingested cholesterol) and transitory. Also a relationship between diet and blood cholesterol has been noted in individuals on strictly controlled, cholesterol-free, fat-free diets, such as the Kempner rice-fruit diet for hypertensives. On such a diet, a regular, rapid decline in blood cholesterol levels has been produced. However, moderate restriction of dietary cholesterol appears to be without significant effect on total blood cholesterol. Keys (15) studied the relationship of cholesterol levels in the diet and in the blood on 482 clinically "normal" men with diets estimated to contain from 200 to 900 mgm. of cholesterol per day. He concluded that the blood level is independent of intake over a wide range, but that at zero intake it falls at a rate related to the pervious level of cholesterol in the blood. Conceivably there may be a critical intake level above zero but below 200 mgm. per day. If so, such a critical level probably differs from individual to individual. In any case, it appears doubtful that so-called "low-cholesterol" diets in current use are controlled strictly enough to reach critical levels and be of any practical value.

Another group of investigators has shown that there is a complete independency of the level of serum cholesterol and the amount of cholesterol ingested within normal dietary variations (16).

The influence of dietary fat may prove to be greater than that of dietary cholesterol in regard to blood cholesterol. Keys reports a study on one subject who was changed from a diet completely free from both cholesterol and fat to a diet containing vegetable fat but no cholesterol. The blood cholesterol of this subject rapidly increased to its previous high level on this diet devoid of any cholesterol or animal fat but containing moderate amounts of corn oil. This subject was estimated to be accumulating cholesterol at the rate of 700 mgm. daily on the latter diet (15).

Experimental hypercholesteremia in rabbits has been produced by feeding large amounts of cholesterol (17). However, the correlation of these findings with human cholesterol metabilism is questionable since the rabbit is normally a herbivorous animal. Also it has been calculated that a 143 pound man would have to eat 54 eggs a day to have a cholesterol intake comparable to those given the rabbits to produce hypercholesteremia.

There is a variety of conditions and diseases in which the cholesterol blood level is usually elevated. These include:

Diabetes mellitus
Anesthesia
Nephrotic syndrome
Jaundice
Myxedema
Xanthomatosis
Acute hemorrhage
Vitamin A deficiency
Prolonged starvation
Exercise
Idiopathic familial lipemia
Hypertrophic osteoarthritis
Psoriasis
Therapeutic administration of cortisone and ACTH (18)
Atherosclerosis

The problem of atherosclerosis will be considered in detail later.

Low blood cholesterol levels are found in the following:

Anemia
Hepatitis
Infection
Hyperthyroidism
Inanition
Terminal states

Prostatic obstruction
Intestinal obstruction

FUNCTION OF THE LIVER IN CHOLESTEROL METABOLISM

The liver is known to excrete cholesteral in the bile and to form and excrete cholic acid. There also is evidence that the liver esterifies, synthesizes, stores, and destroys cholesterol.

Excretion—Intravenous injection of deuterium tagged cholesterol is followed by the recovery of deuterium-cholesterol in the blood, organs, feces, and bile. The liver concentration was approximately twice that of blood, while blood and bile levels were about equal. The hepatic tissue has the capacity to accumulate cholesterol and to liberate it into the blood and bile at a relatively constant and equal rate.

Formation of Cholic Acid—Deuterium tag studies (19) have shown that cholic acid is formed in the liver from cholesterol. However, administration of cholesterol will not increase the excretion of bile acids since most of the biliary cholic acid is not synthesized, but only excreted by the liver. It follows that bile acids are not of significance in the elimination of excess cholesterol.

Synthesis—Removal or destruction of large portions of the liver causes a drop in cholesterol ester blood levels. Free cholesterol remains unchanged or may be slightly lower. With healing, there is a return to normal amounts. Apparently, the deficiency of esters is directly related to the amount of liver damage, it being most severe in acute yellow atrophy of the liver. Such a relationship can be explained on the basis of impaired synthesis of cholesterol by the liver.

Storage—Ingestion of moderate to large quantities of cholesterol leads to its accumulation in the liver in the form of cholesterol esters. This is accompanied by a fall in plasma ester levels. There is also an accumulation of fat in the liver with a less than normal proportion of phospholipids.

Destruction—A rise in blood levels of cholesterol, especially free cholesterol, is noted in biliary obstruction. The failure of biliary excretion is not the primary cause for the rise since the intestinal secretion of cholesterol is elevated in states of acholia and exceeds the quantity usually excreted in the bile. Biliary excretion is not essential in maintainence of blood levels for if such were the case, biliary cholesterol should vary with a dietary cholesterol, which it does not. One may infer, therefore, that the liver may destroy some of the excess cholesterol that enters the body.

Regulation of Free Cholesterol to Cholesterol Ester Ratio—Derangement of hepatic function causes a change in the usually constant ratio of free cholesterol to cholesterol esters, as noted above. As esters decrease in the blood, so do they increase in the liver. This inverse ratio suggests a regulatory function of the liver which may be achieved by synthesis, selection, or destruction, or the combination of all three.

Regulation of Cholesterol Esters and Phosphatides—In the liver, the fatty acids of the cholesterol esters formed in the intestine are transferred to choline phosphatides, lecithin for example. This transfer is accelerated by choline and its precursors since these substances form an essential part of the lecithin molecule. More lecithin may be made from this choline and the fatty acids liberated from the cholesterol esters. The liver may then excrete the free cholesterol in the bile. On the other hand, a choline deficiency retards such fatty acid transfer and cholesterol esters accumulate in the liver.

EXCRETION OF CHOLESTEROL

The destruction of cholesterol within the body may take place but not to a degree of consequence in the regulation of blood levels.

Small amounts of cholestanol, the hydrogenated product of cholesterol, are found in the blood stream. Small amounts of cholesterol are found in the urine.

The bile contains large amounts of cholesterol, about 500 mgm. being excreted per day, but this is not the main avenue of excretion for this substance. Bile-fistula dogs excrete amounts of sterols in the feces greater than those in the diets. Bile is, therefore, more an aid in fat absorption than in cholesterol excretion.

In the main, cholesterol excretion takes place directly into the intestine, the large bowel in particular. It has been suggested that a large portion of this cholesterol is that which is present in the leukocytes which are normally disposed of in the feces. However, free cholesterol is passed as such into the bowel also.

The fecal sterols are mainly coprosterol and dihydrocholesterol, both saturated isomers of cholesterol. Neither can be absorbed by the intestine. Coprosterol is formed in the colon since it was not isolated from contents of a ter-

minal ileostomy or cecostomy (20). It probably is a product of putrifactive bacteria.

Studies in which deuterium tagged cholestenone was fed dogs showed D_2 present in cholesterol and coprosterol (21). This substance must therefore be an intermediate product in cholesterol degradation but still with the ability to be reconverted into cholesterol. Coprostanone is always converted into coprosterol. With these facts, the chemical reactions involved in the catabolism of cholesterol are pictured as follows:

Cholesterol ← cholestenone→coprostanone → coprosterol. Dihydrocholesterol is another end product of cholesterol metabolism but unrelated to coprosterol since it is excreted unaltered when fed to animals.

FUNCTIONS OF CHOLESTEROL

Although the participation of cholesterol in various reactions within the body has been proved in some instances, theorized in others, the specific function of the cholesterol molecule in these reactions is unknown.

In general, the most probable normal functions of cholesterol may be listed as follows:

1. Cholesterol aids in the absorption and transportation of fatty acids through the formation of esters, as has been explained previously.
2. Cholesterol also is known to be a precursor of cholic acid, a bile acid.
3. Vitamin D and its provitamin form in higher animals, dehydrocholesterol, are derived from cholesterol.
4. Progesterone, a female sex hormone, has been shown by isotopic studies to be composed of at least a portion of the cholesterol molecule.
5. Cholesterol may be a precursor of adrenal cortex hormone since the cholesterol content of that organ falls after administration of pituitary adrenocorticotropic hormone (ACTH).
6. Because of such findings it is felt that cholesterol may be involved in the metabolism of other steroid hormones as well as carcinogenic steroids.
7. The large concentration of cholesterol in the white matter of the central nervous system has led to the theory that it acts as an insulating medium for the myelin sheaths of nerves.
8. It may function in the regulation of cell permeability and membrane equilibrium, those cells with a high lecithin:cholesterol ratio being more permeable to water-soluble substances. This relationship also may effect cell growth and activity.
9. The neutralizing effect of cholesterol on venoms, bacterial toxins, bile salts, saponins, and soaps is known. The fact that the hemolytic substances, lysolecithin and lysocephalin, found in venoms are counteracted by cholesterol leads some investigators to attach significance to the almost constant cholesterol:phospholipid ratio in the body.
10. Cholesterol may be concerned with the mechanism of immunologic reactions.

Thus it is apparent that there are probably many normal functions of cholesterol in the body. A discussion of the various manifestations of dysfunction of cholesterol in the human would be in order here. But as mentioned earlier, the scope of this paper is limited, and therefore, a brief summary of the cholesterol metabolism-atherosclerosis relationship only will be presented.

ATHEROSCLEROSIS

Of prime interest today is the relationship of cholesterol metabolism to atherosclerosis. Attention has been so focused by the demonstration of the presence of cholesterol in atheromatous plaques, and by the experimental production of atherosclerosis in rabbits by feeding them cholesterol. The added fact that in certain diseases which are characterized by hypercholesterolemia, such as diabetes, there is a high incidence of premature atherosclerosis has given further impetus to the theory that cholesterol is the etiologic agent of these pathological lesions.

The presence of cholesterol in arterial atheromas is most probably due to a direct imbibition of lipids, as well as other constituents of the plasma, through the intimal endothelium under the influence of the high filtering pressure of the arteries. Atheromas contain the same lipids as plasma (22, 23). Amyloid and hyaline, as well as other colloidal macromolecular substances, can similarly penetrate into the arterial subintima.

There are two theories to explain the mechanism by which cholesterol penetrates the arterial wall. One holds that under the filtering arterial pressure cholesterol and other serum lipids enter the vessel walls in association with protein. This lipid-protein relationship has been shown to occur in the serum, and there is evidence that protein and cholesterol pass through natural

membranes together. Once within the tissues, the hydrophilic colloids, protein and lecithin, may be utilized by the cells, while the cholesterol, previously held in colloidal suspension by these substances, may be precipitated to form atheromatous plaques.

The second theory of cholesterol infiltration is based on evidence that the human blood plasma cholesterol level normally stands near the saturation point, and that cholesterol above the saturation point is precipitated. This would explain the finding of "normal" cholesterol levels in some arteriosclerotics; their serum having reached the saturation point is unable to hold more cholesterol. Precipitation may be initiated by the vibrations of the blood column. The precipitated cholesterol may be laid down on the intimal endothelium and then taken into the subinthima. Some investigators believe that the solubility of cholesterol varies greatly, being progressively less soluble with advancing age.

Because of the hypercholesteremia present in animals and some humans with known atherosclerosis, investigators have been working on methods of lowering blood cholesterol levels with the view of preventing, arresting, and regressing such lesions. Attempts at lowering blood cholesterol levels have been directed at the hepatic removal of lipids with lipotropic agents, lecithin and choline, and the release of free cholesterol into the bile. However, this is of little clinical use since cholesterol excreted by the bile is reabsorbed unless the subject is on a fat-free diet.

The most vulnerable site for depleting the body of cholesterol appears to be the lumen of the bowel. Gubner and Ungerleider (12) outline the mechanisms of attack on this exogenous phase of cholesterol metabolism as follows:

A. Decrease ingested cholesterol—this, as was shown by the work of Keys, has little or no effect on blood cholesterol.

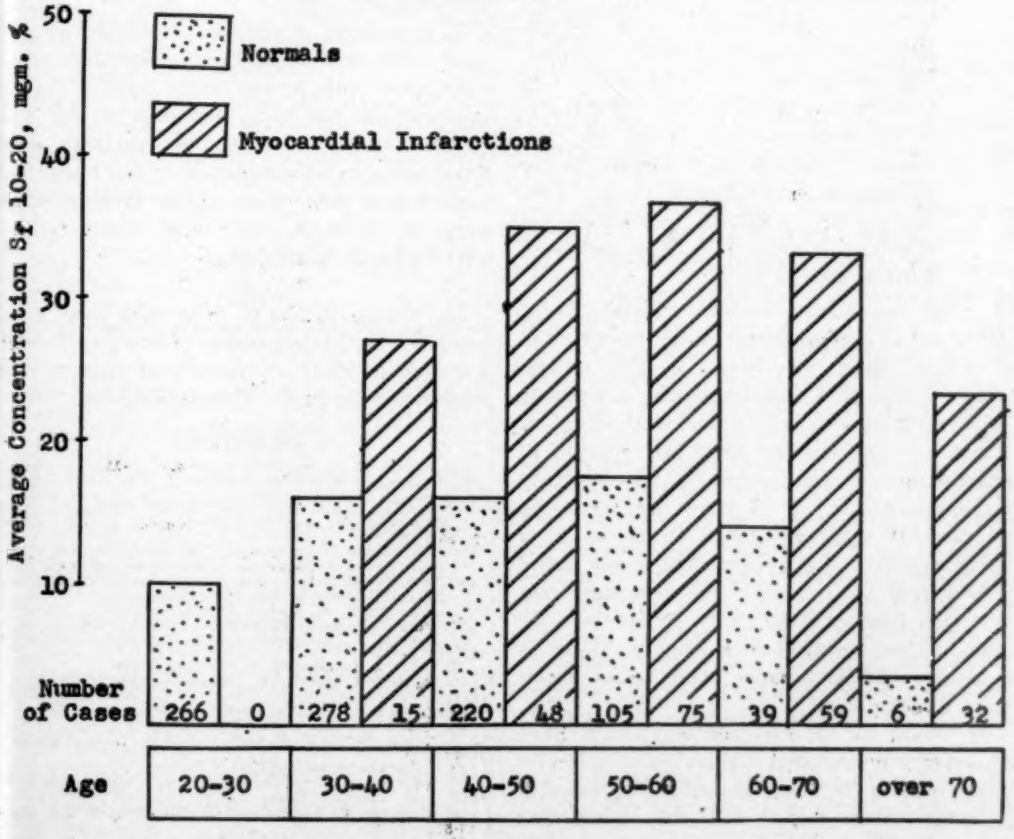

Figure V: Concentration of Sf 10-20 Molecules in Serum of Males. (24)

B. Decrease absorption of cholesterol by:
   1. reducing the fat content of the diet—this reduction must be extreme to be effective;
   2. exclusion of bile from the intestine—intestinal secretions also excrete cholesterol into the gut so exclusion of the bile would be only a partial measure;
   3. interfering with pancreatic enzymes which are necessary for the esterification of cholesterol with fatty acids—such a condition exists in steoatorrhea due to pancreatic insufficiency;
   4. esterifying cholesterol with non-absorbable fatty acids, e.g., arachidic acid of peanut oil;
   5. physical means which prevent cholesterol absorption—non-absorbable fat solvents, such as mineral oil, or steroid absorbing agents, such as silica gel.

C. Increase complete degradation of cholesterol in the intestines.
   1. Bacterial destruction of steroids in the intestine—a diet high in meat protein favors predominance of coliform organisms which degrade cholesterol. It is possible that implantation of highly effective organisms may be an aid.
   2. Chemical destruction of steroids in the intestine—selenium dioxide, cupric oxide, dinitrophenylhydrazine, and sulfite are effective *in vitro* but have not been tried *in vivo*.

Of great significance in the relationship of cholesterol to atherosclerosis is the recent work of Gofman and co-workers (24, 25). Their work indicates that ordinary chemical methods which give blood levels of free and esterified cholesterol may not be sufficiently specific to indicate the abnormal condition which occurs in atherosclerosis. They have put forth the premise that in atherosclerosis there may be a defect in metabolism of the giant serum molecules which are composed of cholesterol and its esters, phospholipids, fatty acids, and proteins and that levels of such giant molecules is of much more importance than serum cholesterol levels, per se.

By means of an ultracentrifuge, they have separated and identified various giant molecules on the basis of their flotation rates (expressed in Sf-units). With this method they found that those molecules with a flotation rate of Sf 10-20 were apparently the ones involved in atherosclerosis production (Figure V). Furthermore, they showed that, although there is a trend toward a higher incidence of Sf 10-20 molecules as total blood cholesterol levels progress above 200 mgm%, there is no definite correlation between total blood cholesterol levels and levels of the giant molecules of Sf 10-20. Persons with cholesterol levels greatly in excess of 200 mgm% have been found with no Sf 10-20 molecules. Conversely, levels of 120-140 mgm% may have high concentrations of the giant molecules.

By placing a group of individuals on a low-fat, low-cholesterol diet (200 mgm. cholesterol and 50 gm. of fat or less per day), Gofman and associates have noted a consistent trend toward lowering the concentrations of the Sf 10-20 components in the blood regardless of the initial value. The rate of reduction varied greatly but was, none the less, conclusive.

In the light of this work, the significance of previous efforts to lower total blood cholesterol is difficult to assess at this time.

In conclusion, it may be said that we still know relatively little of the metabolism of cholesterol, perhaps one of the most important substances in the body, and that we are only on the threshold of solving the problem of its relationship to atherosclerosis. Yet every fact learned is a blow struck at the greatest single cause of death in the United States today—arteriosclerotic heart disease.

* * *

My sincere thanks to those who have given assistance in the preparation of this paper: Bartley Cardon, Ph.D., University of Arizona, and Benson Bloom, M.D., Tucson, Arizona.

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ARIZONA MEDICINE

Journal of

ARIZONA MEDICAL ASSOCIATION

VOL. 8 APRIL, 1951 NO. 4

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The Editor sincerely solicits contributions of scientific articles for publication in ARIZONA MEDICINE. All such contributions are greatly appreciated. All will be given equal consideration.

Certain general rules must be followed, however, and the Editor therefore respectfully submits the following suggestions to authors and contributors:

1. Follow the general rules of good English, especially with regard to construction, diction, spelling, and punctuation.

2. Be guided by the general rules of medical writing as followed by the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. (See MEDICAL WRITING by Morris Fishbein.)

3. Be brief, even while being thorough and complete. Avoid unnecessary words. Try to limit the article to 1500 words.

4. Read and re-read the manuscript several times to correct it, especially for spelling and punctuation.

5. Submit manuscript typewritten and double-spaced.

6. Articles for publication should have been read before a controversial body, e.g., a hospital staff meeting, or a county medical society meeting.

The Editor is always ready, willing, and happy to help in any way possible.

Editorial

THE TWENTIETH LEGISLATURE

The State Legislature in its recent session was the recipient of much favorable comment from various sources. The Arizona Medical Association feels that it can add its share of praise following the manner in which the program it sponsored was considered. The Association was interested in four proposed laws and was responsible for their introduction. None of them in any way pertained directly to the practice of Medicine but were for the general welfare of the public. The first measure provided for the change of commitment of patients to the State Hospital for the Insane.

The Professional Board of the State Association conducted an investigation of this situation 3 years ago, and it made a number of recommendations, which included a modification of the archaic legal procedure of committing patients which has been in force up to this time. These recommendations were presented to the State Bar Association for their consideration, but for unexplained reasons they became bogged down here, and it was only after much effort on the part of Judge Lorna Lockwood, recently elected Superior Judge of Maricopa County, and Edward "Bud" Jacobson, legal representation of the Medical Association, that the bill was resurrected and placed before the legislature. It was passed by both houses without controversy.

A second measure which was passed by both houses made provision for modification of the basic science law to apply to doctors employed by the State Hospitals, the State Board of Health, etc. Under the new law these physicians will be required to have a state license to practice medicine, but will be exempted from the basic science examination. They will be unable to indulge in the private practice of medicine, and the moment they sever their connection with the state institution their state license is automatically cancelled. It is hoped this change will expedite the procuring of capable physicians for the State Institutions.

A third measure legalized a method to obtain cadavers for the study of anatomy and other scientific means by physicians and laboratories. This was interpreted by some as a long range provision for the establishment of a State

Medical School. Our information was that it had little if any opposition in the legislature. These three bills reached Governor Pyle's desk and as this is being written it is quite certain that all will be signed.

The fourth measure was the vivisection bill. This was considered to be on a basis similiar to the anatomy bill. Both are needed to promote the study of medicine from the scientific standpoint. And both measures must be legalized if Arizona is to have a medical school in the future. But, without a medical school, there are a number of physicians in the State who are anxious to carry on scientific research in private laboratories. This bill passed the House, but when it reached the Senate, The National Anti-Vivisection Society unleashed its well known ignorant and fanatical propaganda. The result was that in the last days of the Session, the bill was lost because the Senate did not have time to give it proper consideration.

Aside from the four bills that the Association promoted it was vitally interested in two other pieces of legislature. The first was HB 46. This was the part of the Reorganization Plan which set up the Department of Health, Welfare and Correction. The opposition of the medical profession to proposed reorganization plans of government stems back to the national level, when the present administration in Washington attempted to set up a Department of Welfare with the Hon. Oscar R. Ewing at the head of it, with cabinet rank. The plan was turned back twice last year and the doctors of the nation were given full credit for its defeat. For a number of years the American Medical Association has been asking for a Department of Health in the President's Cabinet and the Secretary of this department to be a medical man. The present bill placed the State Department of Health under the Commissioner of Health, Welfare and Correction, and further stated that the Director of Public Health would be a political appointee who could be removed without cause. The Association disapproved of this feature of the bill and gave public notice of its action. But it was found that both Houses of the Legislature and the Governor had their minds set on the enactment of this reorganization plan. The information was passed along that Dr. Clarence G. Salsbury, at present employed in the State Department of Health would be named Commissioner of the State Department of Health, Welfare and Correction. The bill was passed and has become law. The State Medical Association has full confidence in the integrity and ability of Governor Pyle and Dr. Clarence G. Salsbury. For many years Dr. Salsbury was Medical Director of the Ganado Indian Hospital in Northern Arizona and is well known to the doctors of the state. But the Association is concerned over Governors and Commissioners of the future.

The legislature turned thumbs down on the proposed Naturopathic Bill. The Superior Court has ruled that naturopaths cannot prescribe, and this decision has been appealed to the State Supreme Court. This bill, would have legislated the naturopaths of the State into full fledged prescribers of drugs, under the pretense of allowing them to prescribe nutritional substances. The legislators realized as well as all others that the naturopaths would be either prevented or allowed to prescribe by statute, and if allowed to prescribe nutritional substances, there would be no limit to what such a broad term would include. In other words, the only way to limit their prescribing, would be to prevent all prescribing. The bill did not emerge from Committee.

So again the Arizona Medical Association wishes to commend Governor Howard Pyle and the Twentieth Legislature for the harmonious methods they pursued in attempting to legislate for the common welfare of the public as well as for the majority.

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PHOENIX CLINICAL CLUB MASSACHUSETTS GENERAL HOSPITAL CASE NO. 29071

The Case History in this discussion is selected from the Case Records of the Massachusetts General Hospital, and reprinted from the New England Journal of Medicine. The discussant under Differential Diagnosis is a member of the staff of the Massachusetts General Hospital. The other discussants are members of the Phoenix Clinical Club.

A sixty-five-year old woman entered the hospital because of "gas around the heart" and palpitation.

Approximately one year before entry the patient developed slight constipation, which was relieved readily with mineral oil or milk of magnesia. Since that time she had had intermittent attacks, that is, two or three times per month, of periumbilical crampy pain, each lasting several hours. These were unrelated to food intake or activity and were sufficiently severe on only one occasion to force her to bed. She had had no recurrence of this pain during the four or five weeks prior to admission. She attributed this to pills prescribed by her physician. However, five weeks before entry she began to suffer with considerable belching and sour eructations. The belching was worse at night and half an hour after meals, but was otherwise not related to activity and was not effected by bowel movements. During this same period, palpitation frequently occurred at night. At no time had there been malaise, anorexia, nausea, vomiting, diarrhea, melena, jaundice, dyspnea, orthopnea or ankle edema.

The family and past histories were non-contributory.

Physical examination revealed a moderately obese, somewhat apprehensive woman who did not appear to be uncomfortable. The chest was barrel shaped. Examination of the lungs was negative. The heart was considered enlarged to the left; the sounds were of good quality and no murmurs were audible. The abdomen was soft. There was slight tenderness and a poorly defined mass in the left lower quadrant.

The blood pressure was 167 systolic, 90 diastolic. The temperature was 97.6°F., the pulse 88. and the respirations 18.

The examination of the blood revealed a hemoglobin of 14.7 gm. and a white-cell count of 9700 with 69 per cent polymorphonuclear leukocytes. The urine was normal except for a rare white and epithelial cell in the sediment. A gastric analysis revealed no free acid in the first specimen and 15 units in the specimen collected an hour later. The gastric contents were guaiac negative. Repeated stool examinations were guaiac negative. A Graham test was negative. A barium enema showed narrowing and marked mucosal swelling of the mid-portion of the sigmoid over a distance of approximately 10 cm. Definite ulceration of the mucosa was not visible. There were numerous diverticulums in the sigmoid and descending colon. The colon proximal to the lesion was not examined. Ten days later the barium studies were repeated, barium being introduced by means of a Foley catheter. At this examination there was complete obstruction in the sigmoid in the area of greatest narrowing previously described. The exact nature of the lesion could not be demonstrated because insufficient barium passed the point of obstruction.

An operation was performed on the sixteenth hospital day.

DR PALMER DYSART

Since my fellow discussants have or will plagiarize and draw freely on my comprehensive and classical epic in medical literature on constricting lesions of the colon, published in a recent issue of Arizona Medicine, I will not have to devote much time to further discussion of the basic factors involved in the diagnosis of such a lesion as we are presented with in this case.

Non-malignant strictures of the colon are rare except in connection with diverticulitis, according to Dysart et al. With this lesion occuring in the left colon, the possibility of the constriction being due to a specific type of infection, such as tuberculosis either hyperplastic or ulcerative, and regional or segmental ileo-colitis, becomes more remote. Of course ulcerative colitis is more common to the left of Cannon's ring in the transverse colon, but constriction is not the outstanding feature of this condition.

Of malignant tumors of the colon, sarcoma is the most rare and involves the proximal half of the colon nearly exclusively. Sarcoma characteristically involves an extended portion of the wall of the intestine to produce a tube-like

constriction without mucosal ulceration which could fit the description of the findings in this case upon barium enema, which were described as narrowing and marked mucosal swelling of the mid-portion of the sigmoid over a distance of approximately 10 cm. without definite evidence of ulceration of the mucosa. Numerous diverticula were found in the sigmoid and descending colon.

Carcinoma of the sigmoid colon is much more common than sarcoma. While carcinoma of the right half of the colon is usually fungating, it is more often of the scirrhous type in the left half, but this does not tend to simulate the extensive tube-like invasion of sarcoma, but is more localized.

We are presented with several interesting facts some of which are in apparent conflict. This patient is a 65 year old moderately obese woman who, because of constipation and increasing gastro-intestinal symptoms for a year, is found to have a progressive constricting lesion of the sigmoid colon over a distance of 10 cm. without ulceration. Coincidentally, or possibly associated with this, a diverticulosis of the descending and sigmoid colon was found.

With a known diverticulosis, and a constricting lesion, a diverticulitis is immediately suggested. But, the single reported temperature recording of 97.6 degrees does not indicate much sepsis, and most important of all, I would expect blood to be present in the stools in acute diverticulitis. A white cell count of 9700 with a differential count of 69% polymorphonuclear leucocytes is equivocal. A hemoglobin of 14.7 gm., the obesity and the abscence of blood in the stools, do not suggest far advanced malignancy of the colon, nor rule it out, for the systemic effect of carcinoma of the left colon is a late manifestation.

Neoplasm, usually listed as a sequel of diverticulitis is, according to Walter Palmer, probably merely a coincidence. This can well be so, for with an overall incidence of cancer in the total population at some time during life placed currently approximately at 20%, and a general incidence of 2% of all deaths listed as being due to gastro-intestinal cancer of which 40% occurred in the colon, the incidence of diverticulosis in adults was found at the Mayo Clinic to be about 5%. It would therefore be difficult to prove more than coincidence in the presence of carcinoma of the colon where diverticulosis exists.

Coincidence or the result of diverticulitis, carcinoma does occur associated with diverticulosis, and I believe that because of the abscence of evidence of an acute infectious process which should accompany a progressive constriction of the sigmoid due to a diverticulitis, this is a case of scirrhous carcinoma of the sigmoid associated with diverticulosis.

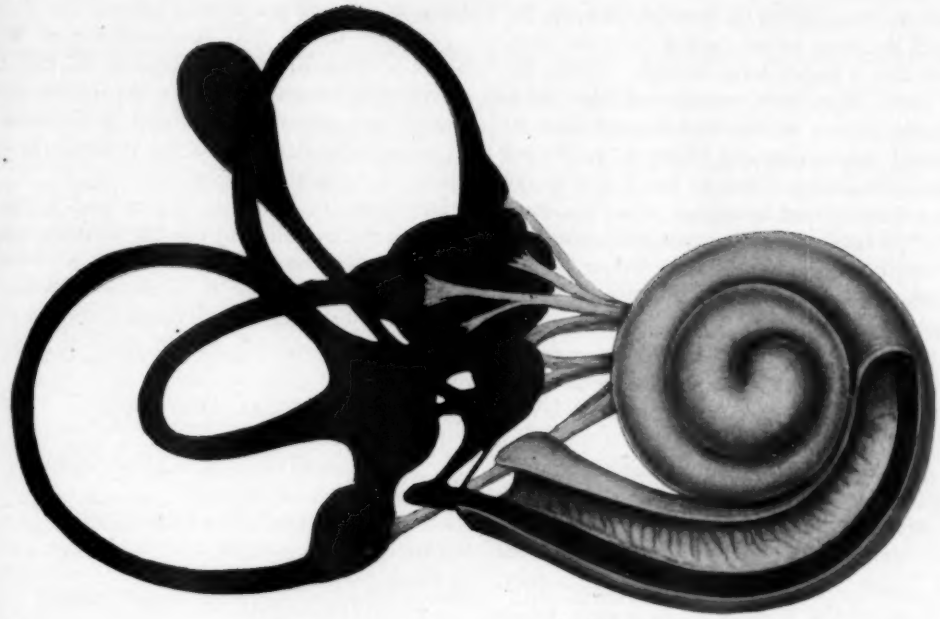
DIFFERENTIAL DIAGNOSIS

Dr. Reginald M. Smithwick: The history indicates that this sixty-five-year-old woman had had symptoms referable to the gastrointestinal tract for about a year. One of these was slight constipulation, which apparently did not increase in severity and was easily relieved by nondrastic laxatives. There were also short periods of crampy abdominal pain occasionally lasting several hours. Later, belching and sour eructations but no nausea or vomiting were noted. There was no distention, increased peristalsis or fever. An indefinite, slightly tender mass in the left lower quadrant tends to incriminate the large intestine. This was confirmed by a barium enema, which revealed a process involving the midportion of the sigmoid—with marked narrowing on the first examination and complete obstruction on a second examination ten days later. There is no evidence in the history of other clinical signs of complete obstruction, such as distention, pain, increased peristalsis, nausea and vomiting. Apparently her bowels moved in spite of the x-ray evidence of marked obstruction, since it is reported that repeated stool examinations were negative for occult blood.

The question for discussion seems to be the nature of the lesion in the sigmoid colon. The x-ray suggests an intrinsic process. A review of the films may be helpful.

Dr. George W. Holmes: There is nothing of interest in the chest. The gallbladder is well seen and looks normal. The colon is obviously abnormal, and the picture is characteristic of diverticulosis, with multiple large diverticulums scattered throughout the descending colon and sigmoid.

At one examination there was no definite obstruction. At another examination ten days later there was definite obstruction. At first examination, in addition to the diverticulums,



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—Tuttle, A. D.: Special Breakdown of Case Histories, presented at the Airlines Medical Directors Association Meeting, New York, N. Y., Aug. 28, 1949.

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there was evidence of spasm. The film taken in the lateral view shows a good outline of the lumen of the large bowel, and it does not seem possible that a tumor large enough to plug the bowel could have been present and have been completely missed at this first examination. At the second examination the filling is insufficient and one could miss a tumor, but I should not expect a large tumor to appear in such a short interval. So far as the x-ray demonstration goes there was no ulcerated lesion or tumor, so our interpretation would be that the obstruction was due to the diverticulitis.

Dr. Smithwick: The two most likely diagnoses are carcinoma and diverticulitis, with or without a localized perforation and abscess. It is possible that both lesions were present. These seem more probable explanations for the sigmoid lesion than tuberculosis, lymphoma, endometriosis, metastatic carcinoma or the extension of a primary lesion of the left uterine adnexa to the bowel. There is no evidence of a benign polypoid tumor of the bowel.

With regard to the differential diagnosis between cancer and diverticulitis, it is at times easy, at times difficult, and occasionally impossible. The age of the patient is not helpful, since either lesion is probable at sixty-five; and the duration of symptoms is quite in keeping with either diagnosis. The absence of clinical symptoms of increasing constipation favors a diagnosis diverticulitis, whereas the x-ray evidence of complete obstruction leads one to favor cancer, particularly if it persisted after a few weeks of proximal decompression of the bowel. The location of the lesion—the sigmoid area—is a characteristic one for both carcinoma and diverticulitis. The absence of blood in the stools is definitely in favor of diverticulitis, since bleeding is present in only about 16 per cent of the cases of diverticulitis and usually occurs in cases of cancer. The presence of a mass is not helpful. Even at operation one often cannot differentiate the two lesions by inspection or palpation. The pathologist has to decide the matter following resection of the involved area. The x-ray evidence obtained from the first barium enema favors diverticulitis because of the long segment involved (10 cm.) and the absence of destruction of the mucosa. The presence of both lesions is statistically unlikely, as diverticulums have been found associated with carcinoma in only 0.6 per cent of cases, whereas cancer has been found associated with diverticulitis in only 1.8 per cent of cases.

It seems to me that the evidence at hand favors a diagnosis of diverticulitis of the sigmoid with a recent increase in the inflammatory process; an associated localized perforation is a reasonable explanation for the recent x-ray evidence of complete obstruction.

Dr. Tracy B. Mallory: If you had a choice between the two alternatives, Dr. Holmes, which would you choose from the x-ray point of view?

Dr. Holmes: There is no x-ray evidence of tumor. If we made the diagnosis from the x-ray examination alone we should have to say diverticulitis.

CLINICAL DIAGNOSIS

Diverticulitis.

DR. SMITHWICK'S DIAGNOSIS

Diverticulitis of sigmoid.

ANATOMICAL DIAGNOSIS

Carcinoma of sigmoid.

Diverticulosis.

PATHOLOGICAL DISCUSSION

Dr. Mallory: This patient was operated on and a segment of the sigmoid was found to contain many large and deep diverticulums. The involved segment was moderately firm. The surgeon's preoperative diagnosis was diverticulitis When he finished the operation he apparently wavered a bit, since he raised the question of carcinoma; but he still put down diverticulitis as his first diagnosis.

When the sigmoid was opened in the laboratory, a small annular cancer was found in the midst of the segment, which had caused a significant grade of obstruction. We could find no evidence that any of the diverticulums were inflamed, and we thought that they were purely coincidental and that the symptoms were due to carcinoma.

Dr. Smithwick: How do you explain the difference in the barium enema in ten days?

Dr. Mallory: There might have been enough difference in the pressures used during the two examinations.

Dr. Holmes: So one got through and the other did not? I hardly think so. Where was the cancer:

Dr. Mallory: In the midst of the area of diverticulosis in the sigmoid.

Dr. Holmes: At the second examination the obstruction does not seem to be abrupt, and I wonder if they failed to get the enema in.

TOPICS OF CURRENT MEDICAL INTEREST

RX, DX, AND DRS.

By GUILLERMO OSLER, M.D.

Important conclusions on DRUG THERAPY FOR TUBERCULOSIS were reported at the Atlanta meeting of the 'TENTH STREPTOMYCIN CONFERENCE of the Veterans Administration and the Nat'l. TB. Ass'n., January 25th to 28th,—

1. The best clinical effect, with a scanty bacterial resistance, is obtained from ONE GRAM of streptomycin TWICE A WEEK, accompanied by 12 grams of PAS daily.

2. Daily PAS seems more helpful than biweekly.

3. The use of large versus small doses, and daily versus biweekly doses of streptomycin for ACUTE LESIONS is still controversial. All seem to work.

4. The comparison of streptomycin and dihydrostreptomycin has not produced a final answer. In the current dosage schedule there is scanty difference.

5. Chemotherapy may seal off secretions and caseations. Bacilli may become 'quiescent'. The 'necrosis factor' may determine relapses when drugs are discontinued.

6. Prolonged therapy may have an added value, with 4 months a minimum, and 6 to 12 months being possibilities in certain cases.

7. Chemotherapy may be added to collapse therapy with profit.

8. Cortisone and ACTH must be considered hazardous.

9. Viomycin, mycomycin, neomycin, etc. are still too toxic for use in humans.

We have at hand eleven articles on CIVIL DEFENSE and/ or THE ATOM BOMB. All of them describe general conduct, and give a list of the types of injury from the bomb. Sixty per cent of those affected will have flash or flame BURNS, yet not a single one of these outlines gives the best immediate treatment of a burn. . . . We will bend an effort to find out what is the best initial therapy, and publish it here.

Freeman and Young of Temple, Texas, report again on SKIN DISINFECTION. They studied 1,131 operative incisions made during one calendar year (Archives of Surgery, November, 1950). . . . A detergent (phisoderm) and a new antiseptic (3% hexachlorophene) were used on the surgeon's hand and the patient's skin. A 2-minute scrub with these preparations is as good as a 10-minute scrub with soap, they say.

The investigative group at the University of Arizona and The SOUTHWESTERN CLINIC AND RESEARCH INSTITUTE, Tucson, has reported a piece of work in the Proc. Soc. Exper. Biol. and Med. . . . ACTH and cortisone increase the output of certain amino-acids. Each affects threomine and tyrosine; ACTH increases lysine; neither affects argenine.

The report on the use of PRISCOLINE in POLIOMYLITIS in Brooklyn (847) patients) is worth emphasizing. . . . The quick action, relief of pain, recession of muscle tightness and spasm, improved skin temperature were notable. The reduction in the 'service' requirements was most important, tho, since hot packs were not needed and transfer of patients occurred earlier. . . . Reports from the recent season should serve to evaluate the usage.

The effectiveness of 'Tapeway', an ADHESIVE-TAPE REMOVER, is good. . . . It has an odor faintly like acetone; does not inflame the skin (like benzine); does not evaporate, nor repell the patient, as does ether. . . . It works poorly on waterproof tape. It quickly cleans the crumbly and adherent residue left by tape. . . . Olson of Wisconsin has demonstrated that the liquid does not irritate incisions, even in excess, and actually is antiseptic.

Two PHONE-ANSWERING DEVICES have recently been described in 'Medical Economics'. The Electronic Secretary sells for $250 to $426, and the Tele-Magnet costs $299.50.

INHALATION OF HUMAN THROMBIN is said by Wassersug to control pulmonary hemorrhage, whether due to tuberculosis, neoplasm, bronchiectasis, et al. (Dis. of Chest). Only a few cases have been reported. They were given 1 or 2 cc. of a saline solution containing 500 to 1000 units of thrombin per cc. . . . Human thrombin is preferred to the ordinary bovine thrombin because it lacks the allergic effect of the latter. . . . If this method works out well, we can use it in addition to the recently reported intravenous pituitrin—provided pituitrin works out well.

Hope, in an old guise, has appeared again for MULTIPLE SCLEROSIS patients. . . . Jonez has reported in the Annals of Allergy the favorable effects of HISTAMINE in 152 cases—a large series in any league. Both acute and chronic cases seemed to benefit. . . . The drug has been used before (1940-45), but has seemed to be just another

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method in most hands. The current approaches were intravenous, subcutaneous, and iontophoresis. . . . Iontophoresis is easiest for home or office use, but must be preceded by at least 30 intravenous injections.

Irvin and Burgess have reported in the New England Journal of Medicine that PROLONGED REST after MYOCARDIAL INFARCTION is NOT desirable. It may be physically and mentally harmful. . . . They believe that two weeks of bedrest, with bedside toilet privileges, is enough in most cases. Walking is then begun, and the patient may leave the hospital in about four weeks. The regimen may be modified to fit circumstances. . . . A sitting position and some movement avoid the hazards of atelectasis, pneumonia, phlebothrombosis, angina pectoris, etc. Psychogenic sequelae are minimized. . . . Arrhythmias and rupture are usually restricted to the first 2 weeks.

Dr. Joseph Aronson of the Phipps Institute of Philadelphia is the person who has most carefully studied the tuberculin sensitivity, and the value of B.C.G. VACCINE, among the American Indians. . . . He has recently (in the American Review of Tuberculosis for February 1951) summarized the fluctuation of tuberculin reactions among the various tribes, living in various geographical areas, as observed during a period of 9 to 11 years. . . . ARIZONA CLIMATE, containing sunshine and perhaps some other elusive factor, is given a huge boost, as follows,—"Fluctutation of the tuberculin reaction, as well as reversions from positive to negative, occurred most frequently among the controls and BCG-vaccinated persons living at the Pima Agency, Arizona. The instability of the tuberculin reaction noted among the BCG-vaccinated living at the Pima Agency, Arizona, cannot be attributed to the low antigenicity of the BCG vaccine, but possibly related to climate factors such as excessive sunlight."

The status of PREGNANCY AND TUBERCULOSIS has become fairly well resolved. A dozen years ago the clinicians at the Sea View Hospital in New York suggested the heretical idea that the two conditions may coexist without special detriment to the mother. . . . Early pregnancy offers no contradiction to surgical or medical treatment of tuberculosis, and the mortality rate is about the same as for the non-pregnant. . . . Proper management and individualization of the pregnancy produces no special hazard to a controlled TB. Delivery is given special care, and the weeks pre and post-partum are carefully protected, and with special freedom from strain. . . . The mother and child are separated for a time after birth, and the infant should be vaccinated with B.C.G.

A letter from Dr. Sol Rosenthal, head of the Tice BCG Laboratory at Cook County Hospital, says that THE NEW DRIED BCG VACCINE has reached the stage where it is now in the hands of the Washington authorities. . . . The disadvantage of the present vaccine is the need to use the suspension within a week, and to be refrigerated or in thermos during shipping and until used. . . . The new material is viable for many months, may be shipped thru the mails without insulation, and produces a high percentage of 'takes' by multiple puncture vaccination. . . . Tice Laboratory was the first one licensed for interstate commerce, in 1950.

A physician of three hundred years ago, Sir Thomas Browne, gives us some comforting reassurance in his 'Religio Medici',—"THAT GENERAL OPINION THAT THE WORLD GROWS NEAR ITS END HATH POSSESSED ALL AGES PAST AS NEARLY AS OURS."

"A NEW MILESTONE IN PREPAID MEDICAL CARE"

An Address By
ELMER L. HENDERSON, M.D.
President, American Medical Association
Delivered Before The
UNITED MEDICAL SERVICE OF NEW YORK
At a dinner meeting held in observance of the United Medical Service's enrollment of its 2,000,000th member
January 25, 1951
Hotel Biltmore, New York City

I am honored to have the opportunity of being with you here this evening on this significant occasion. And I am extremely happy to add my tribute, and that of the American Medical Association, to the United Medical Service for having enrolled its two-millionth member in the Metropolitan New York area.

This achievement is of both local and National significance. It not only demonstrates the great progress being made by all types of Voluntary Health Insurance in the New York area; it also is representative of the rapid growth and development, and the promising potentialities, of all the Voluntary Health Insurance Plans throughout the entire Nation.

The United Medical Service, organized in 1944, is not the oldest of the country's Blue Shield medical care plans, but it definitely is one of the pioneers and top leaders. Operating in seventeen southern Counties of New York State—with the active approval and cooperation

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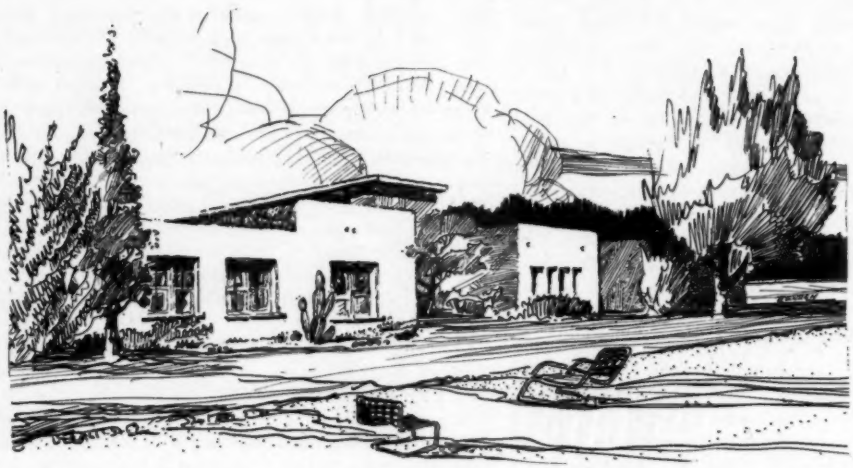

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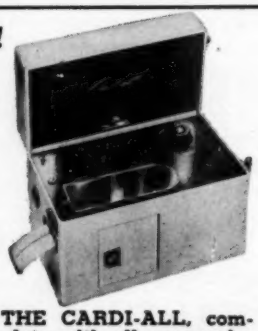

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of the Medical Society of the State of New York, and of the medical societies in those seventeen counties—the United Medical Service has shown a vigorous, progressive development during its six and one-half years of existence.

Your organization, by virtue of both its experience and its excellent leadership, also has contributed much to the National evolution and improvement of Voluntary Health Insurance. It is noteworthy that three of your top officials also are members of the National board known as the Blue Shield Commission: your President, Dr. Charles Gordon Heyd—who is a Past President of the American Medical Association—and Mr. John F. McCormack and Dr. Frederick Elliott.

At the moment, according to my latest information, the United Medical Service is the second largest of the non-profit plans providing insurance protection against surgical and medical bills. I understand that the Blue Shield plan in Michigan, the Michigan Medical Service, edged slightly ahead of you just two or three months ago.

However, I also understand that the United Medical Service of New York is determined to regain first place, and to hold it permanently. Regardless of which particular plan is the largest or the best, it is that spirit of competition which assures that sound, low-cost protection soon will be available to every American who needs and wants Voluntary Health Insurance.

The United Medical Service, I am told, aims at a total enrollment of three million persons within the next year or year and a half. Knowing what you accomplished in 1950—when you gained half a million new members, or one-fourth of your present total enrollment—I am confident that you can and will reach your goal.

My confidence extends to all groups in the Voluntary Health Insurance field—the Blue Cross hospital plans, the Blue Shield medical care plans, all the other non-profit plans sponsored by hospitals and physicians, the insurance companies, and the many plans sponsored by labor unions, fraternal organizations, business and industrial concerns, and other sound agencies. Among all of them, whether they are operating in cooperation or in competition, there is a determination to prove that voluntary methods are the best answer to our medical care problems. And *from* all of them there are continuous reports of rapid growth, improved coverage and new developments.

For example, the Nation's Blue Shield plans alone gained five million new members during 1950, for a new record year of growth. The increase last year exceeded the previous high gain in 1949 by almost two million.

The Blue Shield plans are enrolling new members at the rate of 28,000 every working day, and they now protect more than seventeen million persons, or approximately twelve per cent of the population. Other non-profit medical care plans, which are not yet in the Blue Shield group, cover an additional two and one-quarter million people, making a total of nearly twenty million in just the physician-sponsored plans alone.

There now are seventy-two Blue Shield plans in forty-one States, and participating in their operations are 113,000 out of the 150,000 physicians who are in active, private practice. Last year the Blue Shield plans paid out $150 million for surgical and medical services rendered to member patients.

The Blue Cross hospital plans added more than three million new members in 1950, and they now are beyond the forty million mark in total enrollment.

Out of every dollars paid in premiums, the Blue Shield plans now are paying out eighty-two cents in benefits, and the Blue Cross plans are paying out close to eighty-six cents in benefits.

The facts and figures I have been citing relate mainly to the Blue Cross and Blue Shield plans. The same kind of progress was being made during 1950 by the insurance companies and the various other agencies in the health insurance field, but complete, final figures from all those sources will not be available for several months.

At the end of 1949, we know from the last annual report of the Health Insurance Council, more than sixty-six million Americans had some kind of voluntary insurance protecting them against hospital, surgical or medical expenses. It is a conservative estimate, based on all known developments in 1950, that between seventy and seventy-two million Americans now have some form of Voluntary Health Insurance.

The Voluntary Health Insurance Plans not only are growing rapidly, but they also are developing new and improved types of coverage,

based on sound actuarial standards. As a result of the so-called catastrophic coverage pioneered early last year by the California Physicians Service, fifteen of the Blue Shield plans now are preparing to offer protection against the prolonged, costly illnesses such as heart disease, cancer and others. A number of insurance companies also are experimenting with this type of coverage, or are planning to introduce it in the near future. All of the non-profit plans, the insurance companies and other agencies in the field are studying this important development.

Market progress also is being made in making individual coverage more widely available for persons who cannot get group health insurance. Practically all of the Blue Shield plans, and many of the insurance companies, now offer individual enrollments. Maximum progress in this direction is one of the vital objectives of the medical profession and all others interested in the continued growth of Voluntary Health Insurance.

Another problem which is receiving serious, intensive study, and which ultimately must and will be solved, is how to extend Voluntary Health Insurance protection to older persons who are beyond the retirement age.

The remarkable growth and development of Voluntary Health Insurance—which has taken place mainly in just the past ten years, and which still is gaining momentum—is proving that voluntary methods can take the economic shock out of illness, and that dangerous Government intrusion in the field of medical care is completely unnecessary.

The prediction of medical economists—that ninety million Americans will be protected by Voluntary Health Insurance within the next two or three years—is well on its way to fulfillment . . . and the advocates of socialized medicine are fast losing all semblance of a case.

Voluntary methods also are demonstrating their worth and vitality in the solution of other problems involving the supply and distribution of medical service. Throughout the Nation, many State and County Medical Societies are conducting highly successful programs for placing doctors in communities which need them, for providing medical facilities where needed, for supplying 24-hour emergency medical service, for settling the complaints of patients, for informing the public on matters pertaining to health and medical care, and for insuring adequate medical service for all who need it.

Such programs are proving that effective action can result from close cooperation among doctors, medical schools, public officials and the people of the community. The American Medical Association is urging and promoting the fullest possible development of such programs in every State, County and locality in the country. This is just one more part of the American answer to those who would socialize medicine first, and the rest of the Nation soon after.

There is still another area in which we must prove conclusively that American, voluntary methods can do the job. This is the problem of financial aid to medical education—a matter which has been aggravated and given added prominence by the present National emergency, and also by a great deal of distorted, inaccurate propaganda.

The Board of Trustees of the American Medical Association, at the clinical session last month in Cleveland, took the lead by appropriating half a million dollars as the nucleus of a fund to be raised for the aid of medical schools throughout the Nation. Pointing to the dangers of Federal interference in medical education, the A.M.A. Board of Trustees said: (and I quote)

"There is a growing public awareness that Federal subsidy has come to be a burden, not a bounty, for it is bringing intolerable increases in taxation, and is dangerously increasing Federal controls over our institutions and the lives of our people." (end of quote)

The board expressed the hope that its action will stimulate other professions, industries, businesses, labor groups and private donors to help swell the fund for medical education—and it urged all American doctors to contribute individually, and to take the lead in obtaining contributions from other sources.

Since that time there has been a heartening response, in the form of contributions, pledges and expressions of approval and encouragement, from many individuals and organizations both in and out of the medical profession.

As the second concrete step in this project, the American Medical Education Foundation, a nonprofit corporation for the receipt of funds for medical education, has been organized under the laws of Illinois. Contributions to the Foundation can be addressed to 535 North Dearborn Street, Chicago 10, Illinois.

The American Medical Association intends to give this drive for funds the widest possible publicity in all medical publications and newsletters reaching doctors. I urge everyone present here tonight, whether doctor or layman, to do everything he possibly can to contribute individually, to encourage donations by others, and to cooperate in any future fund-raising plans which may be announced.

Assuring an adequate future supply of doctors—through American methods which will preserve the standards and freedom of medical education—is of vital importance to the continued success of the medical care plans, to all those engaged in the provision of health services, and to every American citizen. The medical profession is willing to take the lead, but it also needs and asks the help of all Americans who prefer initiative and enterprise to Government domination and control.

REPORT OF THE ARIZONA ADVISORY COMMITTEE TO SELECTIVE SERVICE SYSTEM

The Council of The Arizona Medical Association, Inc., at a meeting held January 25, 1951, indicated its desire that a report of this Committee be made periodically to the members of the Association in order that they may be informed of our activities.

To those of you who might not have knowledge of our organization and operation, and without going into too much detail, I might say that its Chairman was appointed by the Chairman of the National Advisory Committee to the Selective Service System, Dr. Howard A. Rusk, as his medical representative for the State of Arizona. Dr. William A. Baker was likewise appointed to represent the dental profession of the State, and Dr. James P. Ward the Public Health interests. Your representative immediately thereafter appointed the membership of the Procurement and Assignment Committee of the Medical Association to assist. As some of you may know, this Committee membership is composed of Drs. Francis M. Findlay, Robert E. Hastings (President), Hilary D. Ketcherside, Harold W. Kohl, Jesse B. Littlefield, Robert M. Matts, Joseph P. McNally, Frank J. Milloy (Secretary), and myself as its Chairman. I likewise appointed Dr. R. J. Hight, State Veterinarian, representing the veterinary profession. The purpose of the Arizona Advisory Committee is to assist the National Committee in an advisory capacity to the Selective Service System in the mobilization of the medical, dental, and veterinarian manpower. So much for organization.

On January 12 and 13, 1951, at the call of the National Chairman, Dr. Rusk, a meeting was held in Washington, D. C., attended by your Chairman, Dr. Baker, Dr. Ward, and Robert Carpenter, Executive Secretary of the Association. This meeting was to acquaint the local State Advisory Committees on operational procedures and the major problems which lie ahead. I will not go into detail on the discussions which took place, as I have already appeared before the Pima County Medical Society the early part of last month and made a full report; also a representative group of the Maricopa County Medical Society. I might add, however, that we were all impressed with the urgency of the situation and the major role that the medical, dental and veterinary professions will be called upon to play in this national emergency.

You are all aware of the military questionnaire sent out many months ago requesting certain information necessary to assist the Committee in its deliberations. Recently, and at the request of the National Advisory Committee, a second questionnaire, briefed and in the form of a card, has been mailed to each physician in this state in order to bring the record to date and for uniformity nationally, and the response has been gratifying. I wish to take this opportunity to thank you for your participation as your cooperation is essential to the effectiveness of our work.

On January 31, 1951, there was issued from the State Headquarters of the Selective Service System a report tabulating those registered in the three professions with Selective Service in Priorities I and II, also III and IV. You will be interested to know that there have been registered up to that date 28 medical doctors in Priority I, 9 in II, 149 in III, and 205 in IV.

Following receipt of this report and study of the results of the Local Boards' individual classifications, a meeting was requested and granted by the State Director of the Selective Service System, and recently your Committee met, primarily for the purpose of better under-

standing the local procedures and operations in order that the Advisory Committee may assume its full responsibility and coordinate its activities with those of the State Director; also to review the results of the individual classifications, especially as pertains to those deferred. While to date there has been limited activity on the part of our Committee as pertains to the group in Priorities I and II, our first real problem will present itself just as soon as Priority III, and thereafter Priority IV, is reached. At the present moment it is expected the calendar will be maintained; i.e., that all of Priorities I and II will be called to service within the next four to six months, and unless the international picture changes appreciably by the end of the year the call for Priority III will have been reached. Effective April 1, 1951, and thereafter, all Reserve Officers will be screened by our Committee in accordance with previous order. Your Committee is giving very close attention to the screening process, and as stated before, especially to those individuals receiving temporary deferment. There is no such thing as permanent deferment, and every case of temporary deferment will be reviewed, particularly with the objective to assure replacement wherever possible in order that those so temporarily deferred may be relieved for military duty at the earliest possible moment.

Complete understanding and a united spirit of cooperation is evinced between the office of the State Selective Service System and your Advisory Committee, and every effort will be made to achieve an orderly withdrawal of medical, dental and veterinary doctors to meet both the military and civilian needs.

Joseph M. Greer, M.D., Chairman

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SECRETARY LULL'S LETTER

"The Key to Peace"—An American Classic. The physician who can find a few spare moments should read Clarence Manion's American classic, "The Key to Peace."

The American Legion was so impressed by the quality and the importance of Mr. Manion's dynamic and thrilling restatement of American principles that it is giving the 120-page book widespread distribution.

Copies have been sent to all members of the A.M.A. Board of Trustees and of the Campaign Coordinating Committee. President-Elect John W. Cline, San Francisco, was so impressed after reading it that he sent the publishers, The Heritage Foundation, Inc., 75 East Wacker Drive, Chicago 1, a letter in which he said he sincerely hoped that "it would be read by every physician in the country."

"I have read and reread 'The Key to Peace'," Dr. Cline said in a letter to Dean Manion, who heads the College of Law of Notre Dame University. "It is one of the most penetrating treatises on American political thought I have encountered and is an extremely important contribution. I sincerely hope that it will have wide-spread circulation and know that it cannot fail to impress upon people the necessity of preserving individual freedom in this country."

Many who have read the book say that it is the best statement of the philosophy of freedom ever written.

Here are a few excerpts:

"It is to the private enterprise of American men and women that an enslaved and starving world looks today for food and sustenance. If state-owned and state-controlled economies could outproduce private enterprise uncounted millions of men and women would not have died of starvation in Soviet Russia since 1920. Neither would we now be considering the indefinite extension of the 'Marshall plan' every dollar of all of which is in addition to the more than 50 billion dollars worth of goods that we have donated to foreign governments since the end of World War II."

—o—

"Here is one example of centralized governmental operation: Paul wants some of Peter's property. For moral as well as legal reasons, Paul is unable personally to accomplish this desire. Paul therefore persuades the government to tax Peter in order to provide funds with which the government pays Paul a "subsidy.' Paul now has what he wanted. His conscience is clear and he has proceeded 'according to law.' Who could ask for more?—why, Paul, of course, and at the very next opportunity. There is nothing to stop him now except the eventual exhaustion of Peter's resources."

—o—

"It has been correctly stated that socialism is communism on a slow train. Socialism performs its totalitarian operations under the anesthetic of 'democratic' terminology while communism draws the same blood visibly, violently and with an open profession of its complete and unrestrained dictatorship."

—o—

"In 1936, Mr. John Strachey wrote in his 'Theory and Practice of Socialism': 'It is impossible to establish communism as the immediate successor to capitalism. It is, accordingly, proposed to establish socialism as something which we can put in the place of our present decaying capitalism. Hence, communists work for the establishment of socialism as a necessary transition stage on the road to communism.'

"At this writing, Mr. Strachey is War Minister in the Socialist government of Great Britain."

—o—

"The process of governmental liberation takes different forms at different times. In recent years the process has taken the form of taxing and spending by the federal government. The successful use of this form of governmental liberation constitutes the most serious threat ever made against the maintenance of constitutional limitations in the United States."

—o—

"Unless constitutional limitations upon the spending powers of Congress are effectively and speedily established, all other constitutional limitations will soon be swept aside in our constantly accelerated drive toward centralized socialism. Money is power and, when the materialistic concept controls, unlimited money is unlimited power."

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"Today, big and complicated government has a hand in everybody's business and another in every person's pocket. These hands are moved by relatively obscure people tucked away here and there throughout the fathomless maze of government's bulging burocracy."

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Vice-Presidents :Dr. Frank Howitt (Treasurer), Dr. Philippe Bauwens (Chairman of the Executive Committee).

Hon. Secretary: Dr. A. C. Boyle.

Address: 45, Lincoln's Inn Fields, London, W.C.2.

The Congress will be held in London from the 14th to the 19th, July, 1952.

In accordance with the regulations of the International Federation of Physical Medicine, the meetings of the Congress will be reserved for matters dealing with the clinical, remedial, prophylactic and educational aspects of Physical Medicine and with the diagnostic and therapeutic methods employed in Physical Medicine and Rehabilitation.

Technical, scientific and historical Exhibitions also will be arranged.

In addition to the Scientific Program, a full programme of social events and entertainment is being planned for the members and associate members. Arrangements for London and provincial visits of scientific and historical interest are also being made for the Congress week and the following week.

This is a preliminary notice and full details will be notified later. Applications for the Provisional Programme should be addressed to the Honorary Secretary, International Congress of Physical Medicine (1952) 45, Lincoln's Inn Fields, London, W.C.2.

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PERSONAL NOTES

Dr. John W. Kennedy, Phoenix, spoke before the Gila County Medical Society, Miami, Arizona February 21, 1951. His topic was "Abnormalities of Pulmonary Physiology in the Pneumococcioses."

Dr. Charles Van Epps, Phoenix, addressed the February staff meeting of St. Joseph's Hospital, Phoenix, on February 12th. His subject was "Case Presentation of Spontaneous Rupture of the Uterus." It was discussed by *Dr. O. O. Williams,* Phoenix.

Dr. R. W. Ripley, Phoenix, discussed the "Contemporary Treatment of Meningitis" at the February 19th St. Monica's Staff Meeting. *Dr. Marcy Sussman,* Phoenix spoke at the same meeting on "Unusual Cause of Metastatic Disease."

At the February 26th meeting of the staff of Good Samaritan Hospital, Phoenix, *Dr. Walter Abbott,* of Des Moines, Iowa, well-known neurosurgeon, spoke on "Complications of Head Injuries."

Dr. Marcy Sussman, Phoenix, spoke on "Lymphoblastoma of the Stomach" with presentation of four cases, and *Dr. Henry Siegal,* Phoenix, presented "An Unusual Case of Pregnancy and Fibromyoma of the Uterus," at the Good Samaritan Staff Meeting.

Dr. Jeffrey A. O'Connor, Phoenix, has reported for duty with the medical department of the army at Fort Ord, California.

Dr. Joseph Baer, Chicago, Professor Emeritus of Obstetrics and Gynecology, Rush Medical School, Chicago, and Immediate Past-President of the American Gynecological Society spoke on "Endometriosis" before the March 5th session of St. Joseph's Hospital.

At the annual midwinter conference of the Los Angeles Radiological Society, *Dr. Marcy L. Sussman,* Phoenix, discussed a paper of Dr. E. B. D. Neuhauser, Boston, Massachusetts, on "Congenital Malformations of the Heart and Great Vessels Amenable to Surgery."

Mr. Joseph Donovan, Executive Secretary, Santa Clara County Medical Society spoke before the March 12th meeting of the Maricopa County Medical Society. He was in Phoenix at the invitation of the Maricopa County Medical Society to make a survey and recommendations for a public relations program for the Maricopa County Medical Society. Such a program was approved by vote of the Society membership following the talk and discussion and a sixty-dollar annual assessment of the membership approved to finance the program.

Dr. J. F. McCahan, Assistant Secretary of the Council on Industrial Health of the American Medical Association, spent the day of March 13th in Phoenix discussing the Industrial Hygiene Program of the American Medical Association with officials of the State Medical Association and the State Department of Health.

In the morning *Dr. McCahan* conferred with *Dr. J. P. Ward,* Director of the State Department of Health regarding the Industrial Hygiene activities of the State Health Department. At luncheon he met with *Dr. Frank Milloy,* Secretary of the State Medical Association, Dr. C. H. Gans of Morenci, Chairman of the Industrial Relations Committee of the Arizona Medical Association, and *Dr. R. S. Haines* of Phoenix, member of the Industrial Relations Committee, and *Dr. Ward* to discuss the part that private physicians should play in the prevention of industrial health hazards. *Dr. McCahan* stressed the importance of private physicians being alert to industrial dangers not only as they regard accidents, but also as a cause of illness.

In the afternoon *Dr. McCahan* discussed further possibilities of increased industrial hygiene activity with *Dr. Gans, Dr. Ward,* and *Mr. Harry Jordan,* the Industrial Hygiene Engineer for the State Department of Health.

Before coming to Phoenix *Dr. McCahan* had visited in Texas and New Mexico conferring with officials of the State Medical Associations and the State Departments of Health regarding Industrial Hygiene Programs. In the afternoon *Dr. McCahan* left for Los Angeles to continue his meetings with those physicians interested in the Industrial Hygiene Program in California.

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Mrs. Arthur A. Herold, President, 1950-51

Our President, Mrs. Arthur A. Herold, was born in Shreveport, La., and attended school there until she was ready for college. She is a graduate of H. Sophie Newcomb College of Tulane University in New Orleans, La. On Jan. 24, 1912, she married Dr. Arthur A. Herold, also a native of Shreveport. They have four children, three sons and a daughter. She organized her local Auxiliary in 1928 and her State in 1929. She is past president of the Southern Medical Auxiliary, as well as of her Parish and State Medical Auxiliaries. She has been on the National Auxiliary Board since 1931.

YAVAPAI COUNTY NEWS

Yavapai County Auxiliary had their annual rummage sale for their welfare fund on Feb. 16 and 17. The money thus raised will be used to cover whatever donations they make to both local and national welfare causes. They also collected enough money at their last meeting to buy sheets and window shades for the Prescott Salvation Army dormitory, and when a local family was burned out several weeks ago, they provided quite a few necessary items for their new home.

MARICOPA COUNTY NEWS

Maricopa County Auxiliary is well represented on the various committees which are putting over the very big project of getting every person over 15 years of age in Maricopa County to have a chest x-ray. This project under the auspices of the Maricopa State Health Department will cover many months and the Doctor's wives are working along with their husbands and members of many other organizations to make it a big success. The meeting, held on March 12th at 8 P.M., was a dessert bridge affair with a short business meeting and the emphasis on meeting and greeting old and new members.

GILA COUNTY NEWS

Gila County Auxiliary, though small in size, makes great plans and carries through with them. At a recent meeting they voted to send a check for $446.19 to Mr. Craig, Superintendent of the Gila General Hospital for the furnishing of a corner room in the new hospital. A bronze plaque on the door of this room will give the name of the Donors.

They also plan to investigate the possibility of sponsoring a series of radio programs on the local radio station. A benefit card party and tea will be held by the members on Wednesday, April 11th at the Country Club. This small group also was 100% subscribed to Bulletin and "Today's Health."

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(1) Mann, G. V., and Stare, F. J.: Nutritional Needs in Illness and Disease, J.A.M.A. *142*:409 (Feb. 11) 1950.

(2) Stieglitz, E. J.: Hypertensive Arterial Disease and Hypotension, Chapter 30, Geriatric Medicine, The Care of the Aging and the Aged, 2nd ed., Philadelphia, W. B. Saunders Company, 1949.

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